JUNE, 1941

ELECTRICAL SOUTH

HUNTER engineers have now worked out the largest single order for Zephair night cooling systems so far recorded in the hotel industry. ● Southwest Hotels, Inc., in Little Rock are equipping practically all of the floors of their hotel properties in that city with this latest HUNTER product. ● HUNTER is still able to make some surveys for this season to co-operate with hotel and other property managers and offers its services promptly without charge.

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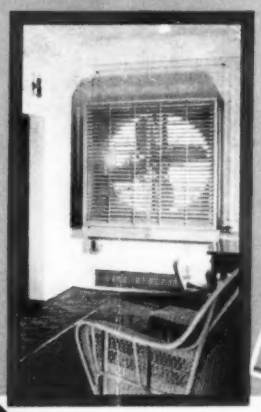
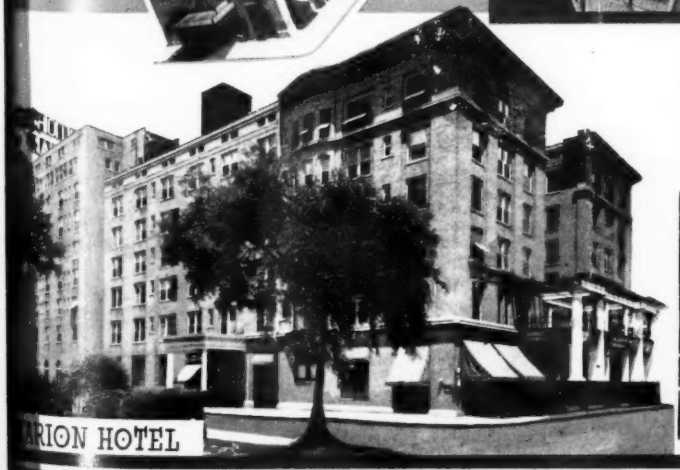
GEHEE HOTEL



HOTEL LaFAYETTE



RION HOTEL

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DON'T PAY
FOR CURRENT LOST IN TRANSIT!

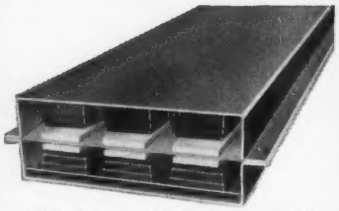
"LO-X" BUStribution DUCT increases current carrying ability — minimizes losses from heating and voltage drop.

"LO-X," the latest addition to Bull Dog's Flexible Electrical Distribution Systems, assures industrial users of electrical power of ample voltage at the point of application—motor, welder, inductive load — *wherever and whenever needed.*

"LO-X" is designed especially for the most efficient distribution of current in the conductors, and for the most effective heat dissipation characteristics. The result is greater current carrying ability, lower temperature rise and less voltage drop due to reactance.

"LO-X" may be used alone, or it may be used as a Feeder with Bull Dog's "Plug-in" type BUStribution DUCT and associated fittings. Whatever the installation, "LO-X" affords a high load capacity, better voltage regulation, greatly reduced line drop—and consequently more efficient and uniform operation.

"LO-X" BUStribution DUCT is available in from 500 amp. to 4,000 amp. capacity, 600 volts or less, single phase, three phase, and three phase 4 wire. Write for complete information, or ask to have a Bull Dog sales engineer call on you.



This is an end view of a standard section, three phase "LO-X" BUS DUCT. Reactance drop is kept to a minimum through extremely close spacing of bus bars in a specially designed assembly. This design with its minimized magnetic field permits the use of a rugged steel duct casing with no sacrifice of efficiency.

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ELECTRIC PRODUCTS CO.
DETROIT, MICHIGAN
Bull Dog Electric Products of Canada, Ltd., Toronto, Ontario

For welder installa... such as the one shown he... and for similar indust... loads, especially at low pow... factors, "LO-X" BUS-trib... DUCT affords a high load ... pacity, better voltage re... tion, and consequently ... efficient and uniform operat...

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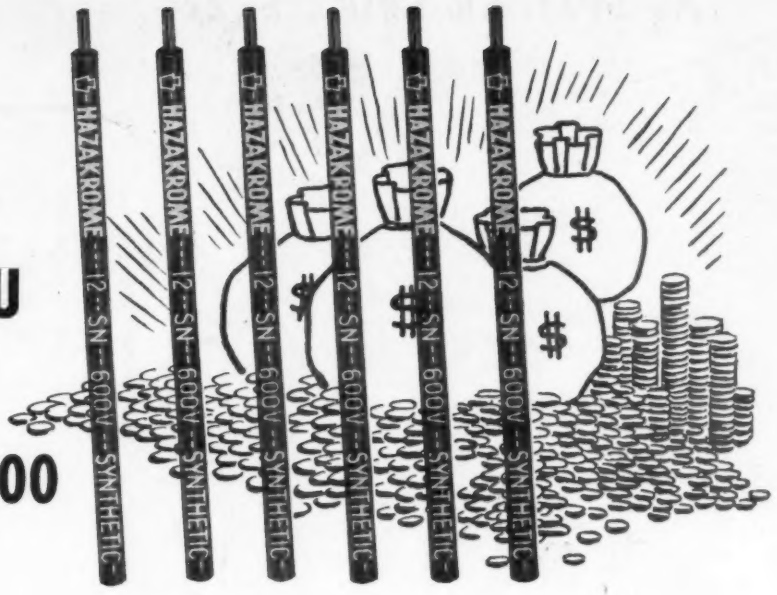
Volume 21 Number 6

WOULD YOU PROTECT $6,000,000,000 ?



You certainly would if you could. And that's exactly why so many owners of the 6 billion dollars worth of inadequately wired buildings in this country are rapidly taking advantage of Hazakrome Type SN Small Diameter Building Wire.

At last . . . by rewiring existing raceways with Hazakrome . . . they can afford to modernize the electrical capacity of their buildings to meet competition.

Alert electrical contractors everywhere are going after this tremendous market that Hazakrome makes so easy to sell. In just one city alone, 23 office buildings have been rewired since this new method was introduced.

And don't overlook this important fact — there's usually a double profit in every rewiring job you sell! For electrical modernization includes new service entrance equipment, branch circuit panels, lighting fixtures, etc.

LET US HELP YOU

To make sure you get your full share of this new business, you should have the Hazakrome Handbook. It gives you all the facts about Hazakrome Type SN Small Diameter Building Wire . . . tells clearly how to figure installations and capacities . . . gives you a tested program to sell more rewiring jobs. Send in the coupon below for your copy of the Hazakrome Handbook today!

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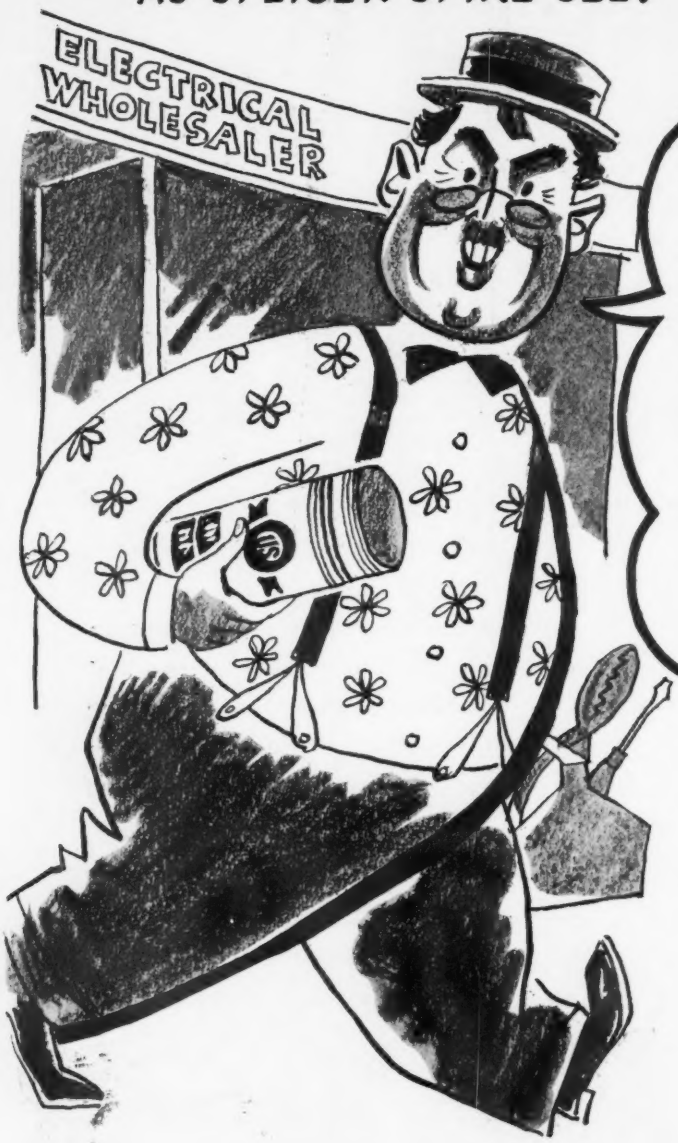

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9

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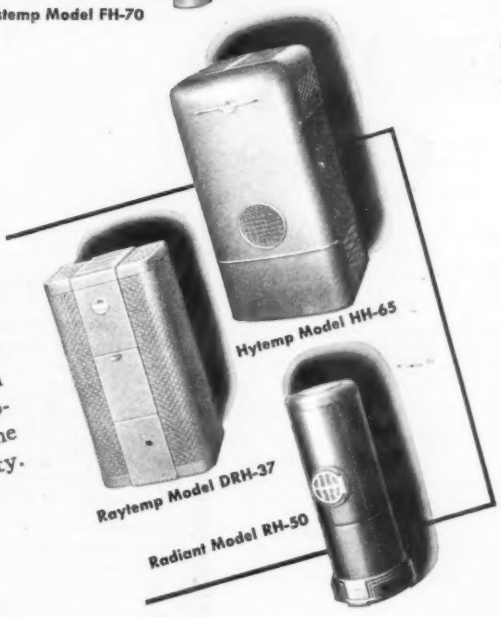

Hytemp Model HH-65

Raytemp Model DRH-37

Radiant Model RH-50

The new 1942 Norge Home Heaters are certain to continue to break all previous Norge sales records. For here are new models engineered and hand-tailored to meet known dealer and home owner wants. And the entire line, backed by all that the good name Norge stands for, will be further supported by an energetic advertising, merchandising and sales promotion program. Write, wire, or 'phone now for the complete story of this unusual sales opportunity.

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ALUMINUM, DEFENSE, AND YOU

ALCOA

3

IT IS EASY TO UNDERSTAND ABOUT ALUMINUM AND DEFENSE

THE WHOLE THING BOILS DOWN to two simple questions:

1. **How much aluminum** are America and England going to need?
   There is only one answer: The democracies must have *all the aluminum it takes to win*, and nobody knows how much that is.
2. **How fast** is aluminum needed?
   We don't know, for sure, but just as fast as the aircraft plants, munition plants, shipyards, and the like, can be expanded to use aluminum and other materials for defense purposes.

THOSE IN AUTHORITY IN WASHINGTON are putting together, day by day, expert estimates of what all these defense industries are going to need, month by month, clear to the end of 1942. These estimates, as issued, are our book of rules.

FOR MONTHS WE HAVE BEEN, and are now, delivering aluminum for defense purposes far in excess of that called for by prior estimates.

DEFENSE IS NOW TAKING from us over 40 million pounds a month. Every American ought to have a picture of just how much aluminum that is; here it is:

Peace-time America, during the nine years from 1930-8, could find use for only 14 million pounds a month from us.

In the busy year of 1939 we had to make only 27 million pounds a month to satisfy the civilian needs of this prospering country.

Suddenly, defense alone needs 40 million a month! 14 million (civilian), to 27 (civilian), to 40 (defense) and soon to 50 and beyond!

★ ★ ★ ★

YOU CIVILIAN USERS of aluminum are grand people.

THE WAY YOU ARE DOING WITHOUT aluminum until producers can catch up again with civilian uses is typically American. We are sincerely grateful for your understanding.

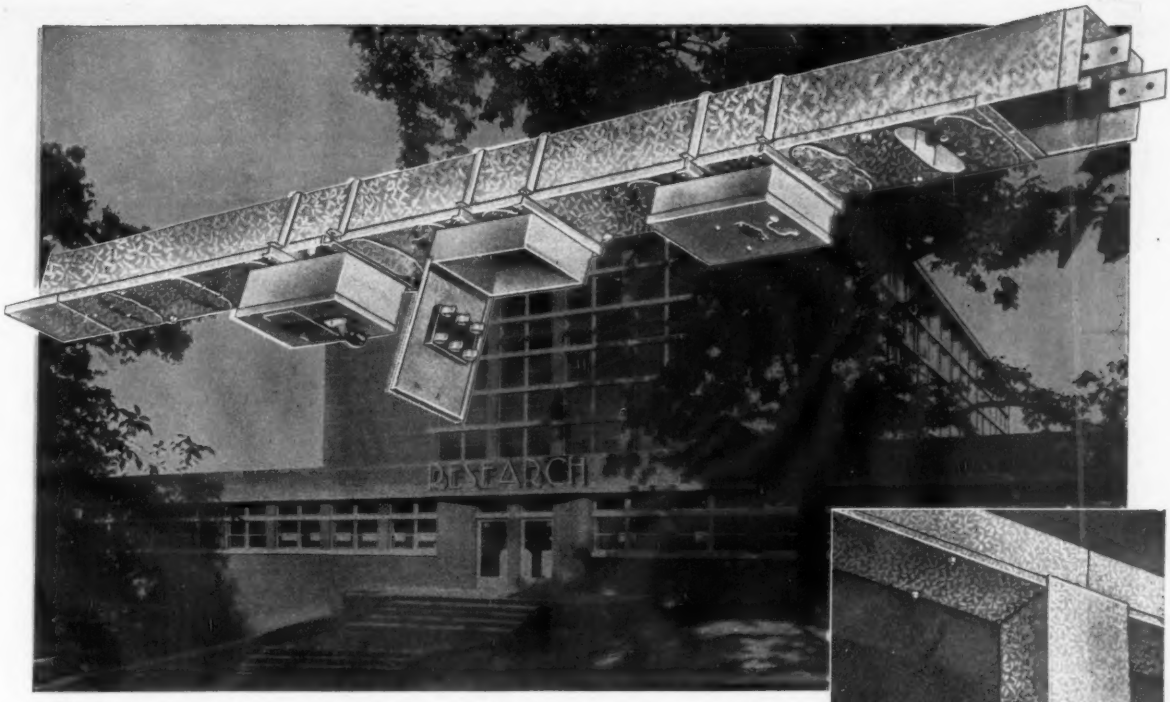
IN THIS RECESS you are having to scramble for **RECESSITIES**—other materials which just don't fill the bill 100%, because there is no pat substitute for aluminum.

IT'S TOUGH ON YOU and it's hard on us to have to turn away temporarily from the friends and pursuits of a lifetime.

WE HAVE NOT TURNED OUR BACKS!

WE INTEND that no civilian shall have to forego the things aluminum can do best one minute longer than we can help.

ALUMINUM COMPANY OF AMERICA



Ⓕ Busduct is installed in the Research Building, Georgia School of Technology, Atlanta . . . Architects: Bush-Brown and Gailey . . . Contractor: Mion Construction Company.

Industry turns to Ⓕ *Busduct*

A circuit breaker type tap-off unit where a Plugin Ⓕ Busduct connects with a Feeder Ⓕ Busduct.

as the modern method for power and light distribution. Many educational, commercial and other types of buildings also are installing this compact, flexible and convenient distribution system.

Ⓕ Busduct affords great flexibility for machine layout. Time lost in changing location of machines is reduced to the minimum. Simply "move the machine — plug in — go!"

Both Feeder and Plugin types are made in standard 10-foot sections. Each section of the Plugin type is arranged with nine plug-in outlets on 12-inch centers. Suitable elbows, tees, end boxes, intermediate feed-in and feed-out boxes, are supplied to fit required space or position — whether on wall or ceiling.

The copper busbars are contained in enclosures of steel or aluminum. They are rigidly supported at 30-inch intervals by specially designed insulators that insure proper spacing — to meet the requirements of the National Electrical Code. Contact surfaces of connecting bars are silver-plated, to prevent oxidation. Designed for 2, 3 and 4 wire feeder systems; 250 volt DC, 575 volt AC, maximum.

Ⓕ Busduct is practically immune to deterioration. It may be taken down and installed in new positions, in the same or different buildings, as need may require. Extensions may be made readily to existing installations. Moderate first cost is combined with low up-keep.

Ⓕ Sales-Engineers can help Manufacturers, Architects, Engineers and Contractors with their Distribution Problems

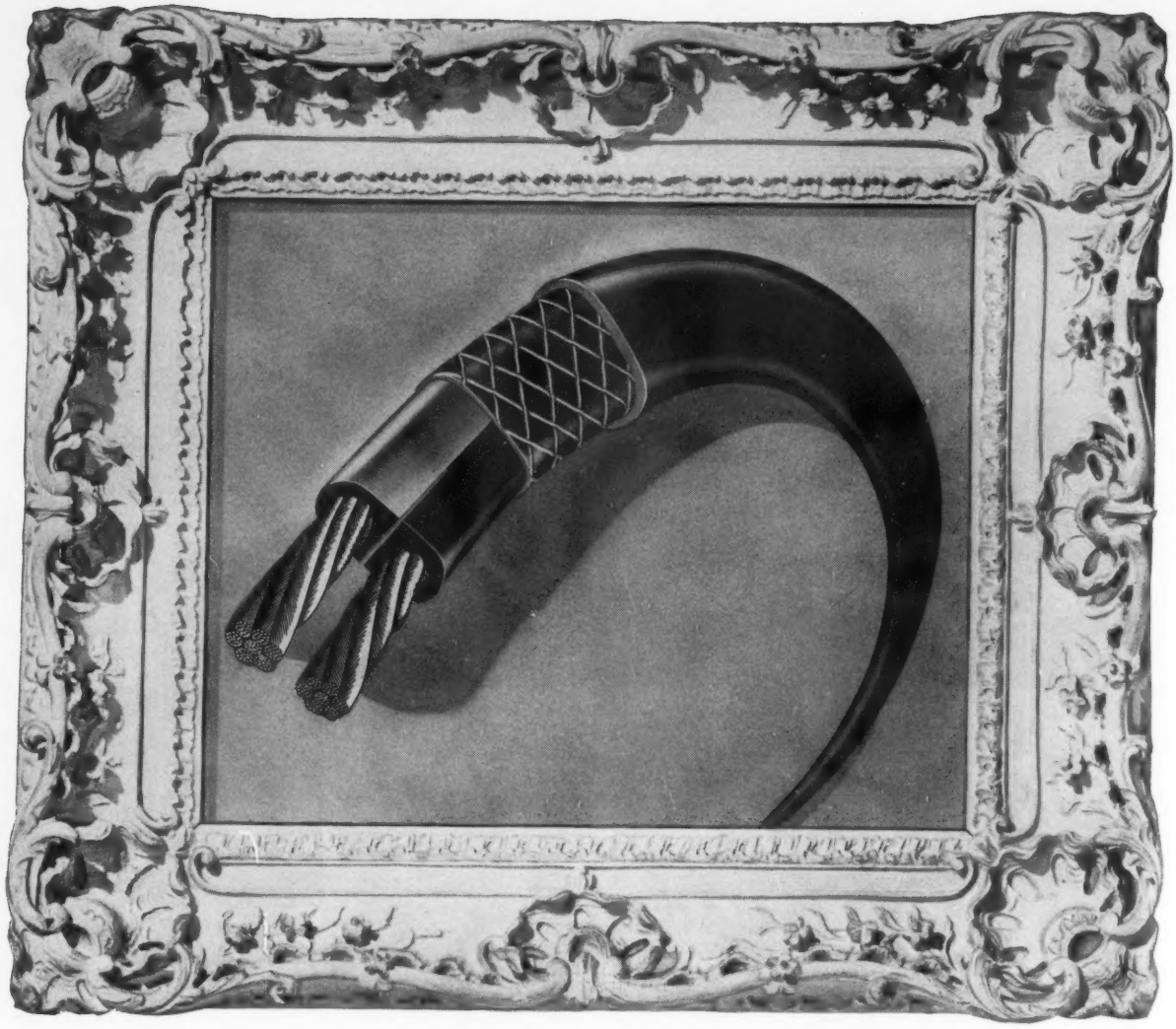
Their long experience and training are at your service — without obligation. Write for the name and address of the one nearest you. Also, for Bulletin 61, which contains complete description, applications and detail drawings of Ⓕ Busduct . . . Frank Adam Electric Company, St. Louis, Mo.

EST. 1891 — THE SIGN OF A BETTER JOB

Frank Adam

1891 FIFTY YEARS SERVICE 1941

FRANK ADAM ELECTRIC CO. ST. LOUIS, MO. U.S.A.



Portrait of a Heliophile*

Ten thousand feet high in the Chilean Andes, you can get an awful sunburn . . . and so can cables. The actinic rays of the sun that high, raise "hob" with cable coverings.

Awhile back, Chile Exploration Company decided they were sick of the hob and gave our research engineers the job of making a cable that could lie in the broiling sun day after day without cracking and failing. So, we made Sunex Securityflex†, a cable that defies the sun ten thousand feet high in the mountains and with equal defiance faces the rough and tumble conditions of mining 3,000 feet below the surface of the earth.

It is an example of the resourcefulness of Anaconda research. It is the same kind of research that produced a great basic advance in paper cable manufacture . . . Type CB† construction that outlasts the standard type by an easily recognizable margin.

The advantages of this research go into every product made by this company . . . and that includes a wire and cable for every electrical requirement. Put them to work for you. There is no premium.

Anaconda Wire and Cable Company
General Offices, 25 Broadway, New York City; Chicago Office: 20 No. Wacker Drive. Subsidiary of Anaconda Copper Mining Company. Sales Offices in Principal Cities.
†Reg. U. S. Pat. Off. 41886

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from mine to consumer

This familiar trademark identifies Anaconda products. It symbolizes the best efforts of man and science.

*Borrowed from the Greeks: *helios* (sun) and *philos* (love of)

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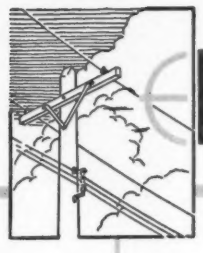
ANACONDA WIRE AND CABLE

JUNE, 1941

Volume 21 No. 6



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"HANG THE LOAD ON HUBBARD HARDWARE"

ELECTRICAL SOUTH

JUNE, 1941

SPEEDY INSTALLATION IMPORTANT FACTOR IN DEFENSE CONTRACTS

New Miami plant of Intercontinent Aircraft Corp. is typical of industrial defense projects that require quick deliveries and fast installation by electrical contractors.

NATIONAL DEFENSE is more than a matter of fighting men, tanks and planes. It involves factory construction. And that means electrical work. As its part in the program, the Wagner Electric Company, Inc., of Miami, Fla., working against time, recently completed the entire electrical installation for the Intercontinent Aircraft Corporation's new Miami plant. Factory machinery started moving in 11 days after work was started.

The job included wiring and all installations necessary to distribution of current for power and lighting. The plant itself consists of an office building, two buildings intended for the production of aircraft, a warehouse, and four smaller structures for sundry use.

The largest of these structures, housing the machine-shop and assembly departments, has a ground area of over 100,000 sq. ft. All electrical installations are designed to facilitate fast and accurate production processes, and to discount the special power and lighting problems presented by each.

The new Miami plant of Intercontinent Aircraft Corp. is a model of modern industrial efficiency. The electrical installation made by Wagner Electric Company, of Miami, is particularly adequate and modern in every respect. Fluorescent lighting, high intensity mercury vapor lighting, trolley duct for mobile use of hand tools, and bus-way distribution are a few of the outstanding features. Shown here is one of the eight buildings that comprise the installation. Interior photographs were not permitted; note guard hurrying toward Electrical South's photographer.

In the area where the plant is located, the utility supplies 60 cycle, 3-phase, 4-wire service at a voltage of 2400/4160 Y. This is stepped down to 115/230 volts by transformers located at load centers in order to effect economies in installation and operation. Pyranol filled transformers were used in order to limit possible fire hazards. The transformer equipment includes gas absorbers. Oil fuse cutouts protect the transformers. At mains in Buildings Nos 2 and 3, cutouts are 400-ampere and 200-ampere, respectively. At the individual transformer banks, 200-ampere gang-operated cutouts of the same type provide for simultaneous control.

The job required approximately 400,000 feet of wire in sizes varying from No. 12 to 1,000,000 cir mils and 150,000 feet of conduit. To facilitate the mobile use of hand power-tools 2,000 feet of Bull Dog trolley duct (Trol-E-Duct) was installed throughout the plant.

Trolley Duct and Busway Used

Ten-foot units were coupled together, providing each manufacturing department the length best adapted to the work being carried on there. Besides contributing to the efficient use of portable electric tools, trolley duct makes possible the adjustment of any necessary movable lighting to the exact working-place where it is most effective.

Safety switches ranging from 30 to 100 amperes handle the current to points of ultimate use. Distribution requires the employment of approximately 225 switches of both types and 15 lighting panels.

The streamlining of current distribution in the heavy manufacturing sections of the plant was effected by the use of over 500 feet of Bull Dog bus power-duct. This method of distribution offers a high degree of flexibility and interchangeability.

For the benefit of readers who do not happen to be familiar with it, bus power-duct best can be described as rectangular duct having in-built bus bars mounted on insulators. Constructed in sections which may be connected to form any desired length, the duct has on two sides regularly-spaced openings for the admission of branch-circuit control "plugs".

Interchangeable plugs are available in types necessary to any particular power application. Changes in current requirements due to alterations in the plant's production setup, readily may be accomplished by the substitution of the proper plugs for those already in use.

The fixed lighting installations are intended to provide the best type of illumination for the kind of work carried on in each section of the plant. The plan aims at the reduced use or complete elimination of portable lamps, despite the fact that provision for these has been made.

The engineering department and the machine shop are fluorescent-lighted. The installation consists of approximately 200 fixtures, equipped with two 40-watt lamps and Alzak aluminum reflectors.

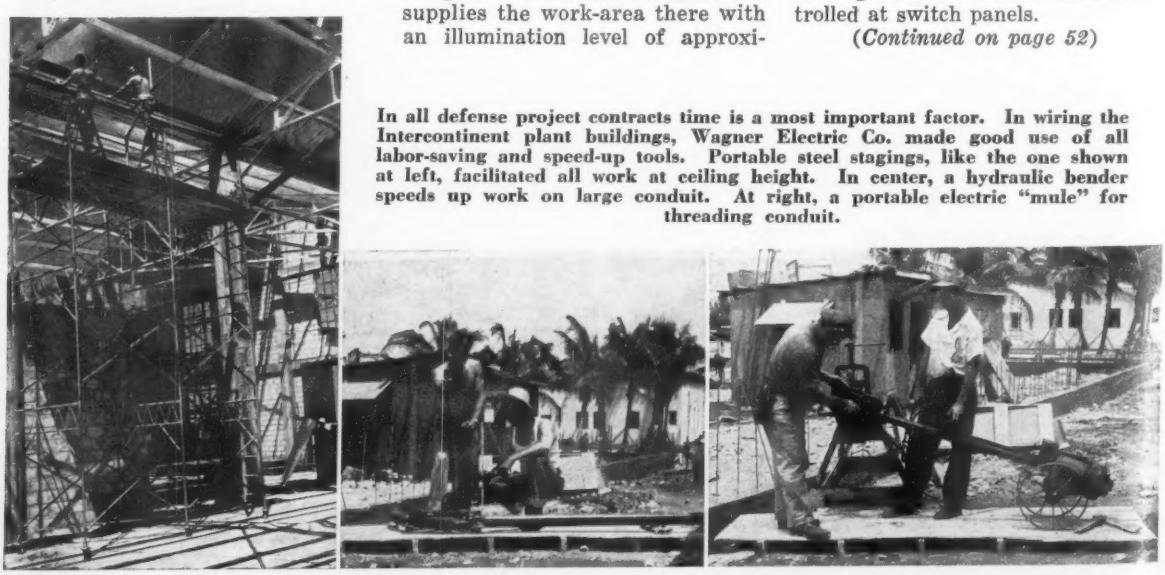
In the machine shop one fixture is spotted over each machine and supplies the work-area there with an illumination level of approximately 60 foot-candles. An individual circuit controls each fixture.

Wm. L. (Bill) Thurman, Wagner Electric's supervisor on the Intercontinent Aircraft job.

The type of lamp employed is particularly adapted for use on close or fast-moving work. The lamp starter is composed of a glow-switch and a condenser designed to minimize radio interference.

In the assembly and in the heavy manufacturing divisions, the illumination is provided by 250 400-watt, high intensity mercury-vapor lamps, equipped with RLM dome reflectors. For industrial use this type of lighting offers the advantages of minimum glare and a beam of long focal-length. These lamps are wired in pairs, each pair operating on an individual circuit controlled at switch panels.

(*Continued on page 52*)



In all defense project contracts time is a most important factor. In wiring the Intercontinent plant buildings, Wagner Electric Co. made good use of all labor-saving and speed-up tools. Portable steel stagings, like the one shown at left, facilitated all work at ceiling height. In center, a hydraulic bender speeds up work on large conduit. At right, a portable electric "mule" for threading conduit.

Contracting Licensing Laws

The trend toward legislation licensing contractors appears to be increasing. Of sixteen states having laws of this type, ten are in the Southeast and Southwest.

IN THE class of legislation designed not only for the protection of labor but also for the protection of the public are those laws which require the examination and licensing of contractors. These laws specify qualifications as to general education, skill, and experience which a contractor or subcontractor must meet before he may receive his license to do business within the State. Practically all of these statutes have been enacted within the past 10 years, and at present are operative in 16 States. (Alabama, Arizona, Arkansas, California, Georgia, Idaho, Louisiana, Michigan, Montana, New Mexico, North Carolina, North Dakota, South Carolina, Tennessee, Utah, Virginia.)

The majority of these laws apply to contractors in general, but several are more limited in their coverage, applying only to public-works contractors (Idaho, Montana, and North Dakota), highway or street contractors (Georgia), or residential-building contractors (Michigan). In a number of the States the laws are applicable only if the cost of the work reaches a specified amount. For example, in Alabama, Arkansas, Louisiana, and North Carolina, only contractors working on construction costing $10,000 or more are affected by the law, while in Tennessee the cost of the work must exceed $10,000. In South Carolina the act relates only to contractors on work costing $7,500 or more. The Georgia statute applies where the cost of the work is $15,000 or more; and in Idaho, Montana, and North Dakota, where the laws cover only public-works contractors, the contract price must exceed $5,000, $1,000, and $2,000, respectively.

Licensing Boards

Provision is made in most of the laws for the appointment of a State licensing board to which contractors are required to apply for a license. These boards consist of from 3 to 7 members (appointed by the Governor), who are or have been engaged in the contracting business. In Arizona the law provides for the appointment by the Governor of one contractor who is to act as registrar. The position of registrar is held by the Commissioner of Public Works in Idaho, in North Dakota by the Secretary of State, in Michigan by the State Corporation and Securities Commission, and in Montana by the State Board of Equalization.

The licensing boards are authorized to designate the necessary qualifications of the applicants for a contractor's license, and may prescribe the form of the application. They also give an examination, where required by the law, and all of the States' licenses issue from these agencies. In Louisiana the board is authorized, after approval by the Governor and Attorney General, to fix reasonable fees to be assessed against contractors licensed under the act. The boards are also given power to revoke the license of a contractor if they find that he was guilty of fraud or deceit in obtaining a license, or has been incompetent in the conduct of his business. Complaint of such misconduct is generally brought by some person within the particular State. After receiving the complaint, the board is required to hold a hearing, and, if it finds the contractor guilty, his license is revoked.

Examinations and Fees

Of the 16 States having laws on this subject, 10 provide for the examination of the contractor by the State board before issuing a certificate of license. (Alabama, Arkansas, California, Georgia, Louisiana, Michigan, North Carolina, South Carolina, Tennessee, Virginia). These States require a contractor to file with the State board an application accompanied by a fee ranging from $10 in California to $500 in Georgia. (It should be noted here that the Georgia law covers only highway or street contractors, and applies only to such contractors when the cost of the project is $15,000 or more). The form of the application is prescribed by the State board. If a contractor's application is satisfactory, the board examines the applicant to determine his qualifications and moral fitness. The examinations may be oral or written or both. If the contractor fails to pass the examination, he is entitled to be reexamined without paying an additional fee. In Michigan a residential-building contractor who can furnish satisfactory proof of having been engaged in such business for 5 years is not required to take the examination. In South Carolina a person legally engaged in the business of general contracting in the State prior to the approval of the act (June 2, 1936) is exempt from examination; the Tennessee statute passed on March 5, 1937, contained a similar provision.

In the remaining six States (Arizona, Idaho, Montana, New Mexico, North Dakota, Utah) having such statutes, the contractor is not required to take an examination. The application must contain detailed information as to the contractor's experience and qualifications, his principal place of business, the value and character of other contract work completed by him and a complete financial statement. In Arizona and New Mexico the application must also contain a certificate of recommendation of two reputable citizens of the county in which the applicant resides. The laws require the issuance of the license by the registrar within periods ranging from 10 to 30 days after the receipt of the application, thus giving the registrar time for investigation.

License fees range from $3 to $250, and in Montana, New Mexico, and North Dakota depend upon the value of the contract work performed. For example, in Montana a class-A license entitling the holder

(*Continued on page 50*)

Reprinted from Monthly Labor Review (February 1941) of the Bureau of Labor Statistics, United States Department of Labor.

Electrical Grounding Practice As Required by 1940 Code

By B. Z. Segall
New Orleans Public Service, Inc.
New Orleans, Louisiana

THE GROUNDING RULES of the Code establish standards for the protection of electrical installations. Quite often, under certain conditions, it is possible to obtain effective protection for both life and property by substituting alternative methods such as insulation, isolation or guarding of electrical equipment and circuits.

The grounding rules are broken down into nine separate main subdivisions as follows:

1. **Systems and circuits to be grounded**
2. **Location of the grounding connections**
3. **Metallic enclosures to be grounded**
   (a) **Conductor enclosures**
   (b) **Equipment enclosures**
4. **Methods of grounding**
5. **Bonding**
6. **Specifications and installation of grounding electrodes**
7. **Specifications and installation of grounding conductors**
8. **Specifications and installation of grounding conductor connections**
9. **Miscellaneous grounding rules**
   (a) **Instrument transformers, relays, etc.**
   (b) **Lightning arresters**

Figure 50 illustrates the location of the major components of a grounding system.

The various electrical systems and circuits are grounded for two reasons:

(1) To limit the circuit voltage to its nominal designed value and to insure the maintenance of this voltage when the circuit is subjected to higher potential stresses such as lightning discharges or accidental contact between the low voltage circuit and some other higher voltage system.

(2) To limit and control the maximum voltage to ground due to the normal voltage of the system.

Figure 51 illustrates these two points. This diagram shows a single phase distribution transformer fed from a 4 kv primary feeder. This primary feeder actually serves many such transformers and in addition may serve three-phase ungrounded secondary banks. While only one service is shown tapped from the secondary mains, actually other customers may be served from this one transformer.

On the primary side it will be noted that the system ground maintains the maximum voltage to ground at 2300 volts from any of the primary feeder phases. Similarly the secondary system phase wires are maintained at 120 volts

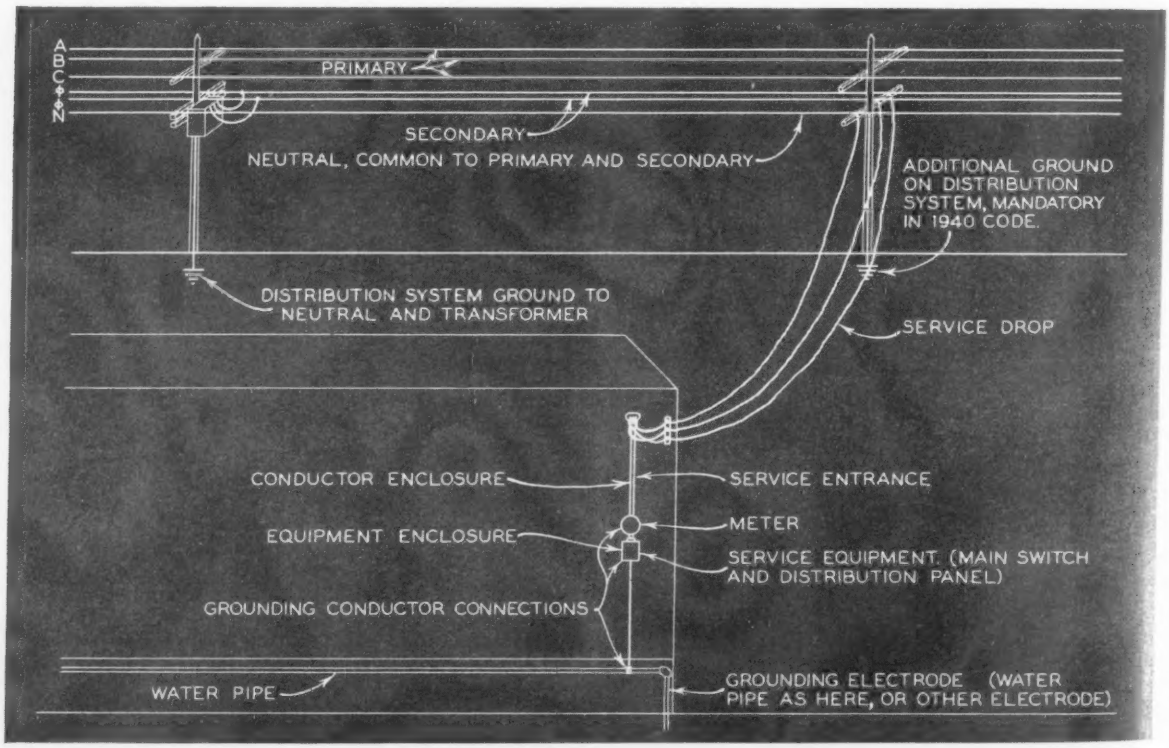


Fig. 50. The location of the major components of a grounding system are shown here.

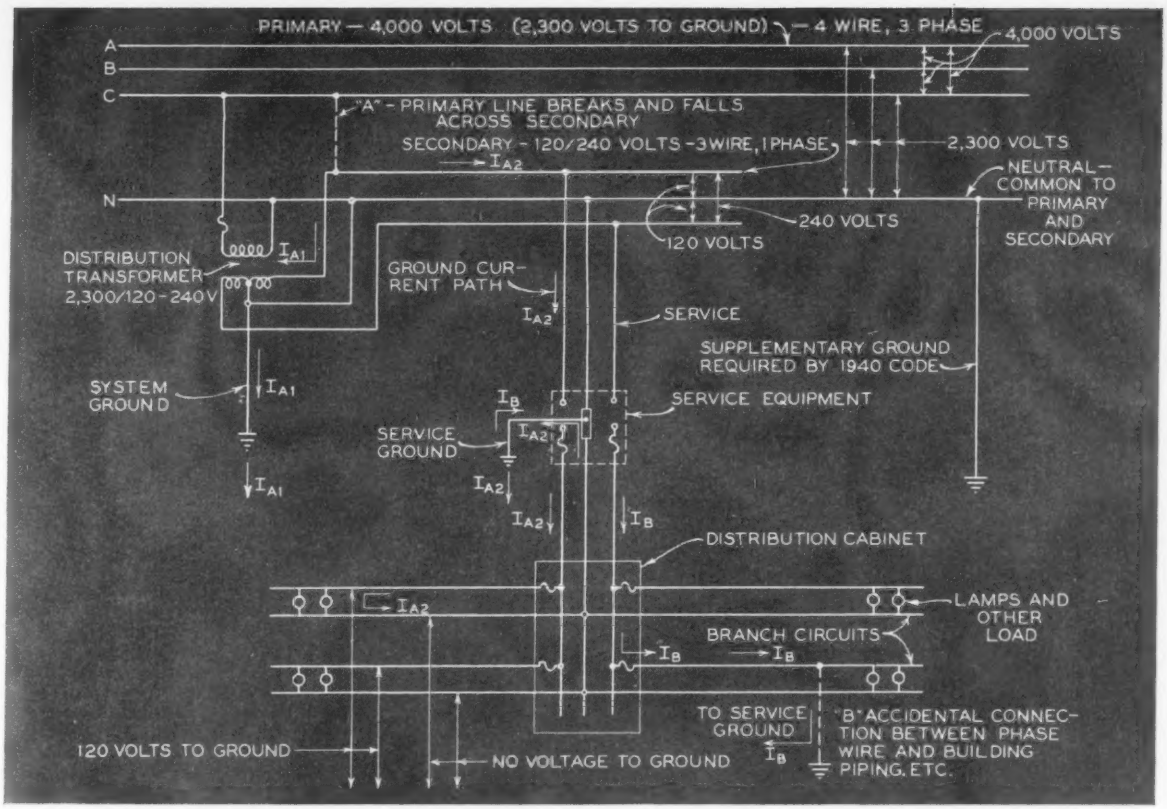


Fig. 51. Grounding of electrical systems and circuits serves to limit the circuit voltage to its nominal designed value even when the circuit is subjected to higher potential stresses and to limit and control the maximum voltage to ground due to the normal voltage of the system. In the diagram, these two objectives are illustrated, first, by the assumption of an accidental contact between high and low voltage systems as shown by the dotted line at "A" with current flow indicated by arrows. The second objective is illustrated by the assumed breakdown of the secondary "hot leg" to ground within the building as shown at "B". The functioning of the system under these two conditions and the important part played by proper grounding are described in the accompanying text.

to ground by the service ground.

It is possible, however, for the primary lines to break, due to a storm or other reasons, and fall across the secondary wires. Thus, an accidental contact is established between the high and the low voltage systems as shown by the dotted line at "A". A current flows, under these conditions, from the "C" phase high tension line, through the accidental point of contact to the secondary wire. From the secondary wire it has two paths to follow.

The first will be along the secondary line back to the transformer and then to the midpoint of the winding to the system ground connection from where it is dissipated to the earth through the system ground conductor. The amount of current flowing will depend upon the ability of the primary feeder to maintain its voltage and also upon the impedance of the ground current circuit.

In most cases the feeder circuit breakers or the transformer primary fuses will definitely limit the current flow. Usually the feeder breakers are set for about 400 amperes and the transformer primary fuses will be rated from 50 to 150 amperes depending on the transformer size. The impedence of the circuit usually is very low, especially if the ground connection is carefully made to some underground water piping system. This ground circuit impedance will vary considerably but in many localities it will be about one tenth of an ohm.

Assuming that for some unaccountable reason the primary fuses do not blow, and the feeder circuit breakers permit full rated current to flow for a short time, then the actual voltage drop in the system from any part of the wiring to the ground would be the product of this maximum current and the circuit impedance, i.e., 400 amperes times .1 ohm or 40 volts. With such low impedance, a momentary flow of even 2000 amperes would produce 200 volts above ground. This current would flow for only a very short period since under such overloads the breaker or fuses would quickly open the circuit.

The second path to ground, of course, would be through the secondary line, into the service switch and over-current protection, through any connected apparatus, into the neutral wire, back to the service ground connections, and to ground. Here again the smaller service over-current device would limit the current and open the circuit before any dangerous potential could be created. The accidental ground current would divide between the two paths in an inverse proportion of their respective impedances. Thus the larger current would flow through the smaller impedance circuit and the smaller current through

(Continued on page 16)

Adequate Wiring in Dallas

Certified wiring and electric kitchens help sell new homes

LAKEWOOD ESTATES, a new subdivision in northeast Dallas, Texas, is a project calling for nearly 250 new homes, all scheduled to have wiring up to National Adequate Wiring Bureau standards and all-electric kitchens. Electrical contractor is J. Hardy Burroughs, of Dallas. Arrangement of the kitchens and much of the electrical design was worked out by Fred Staehle, advertising and sales promotion manager of General Electric Supply Corporation, Dallas.

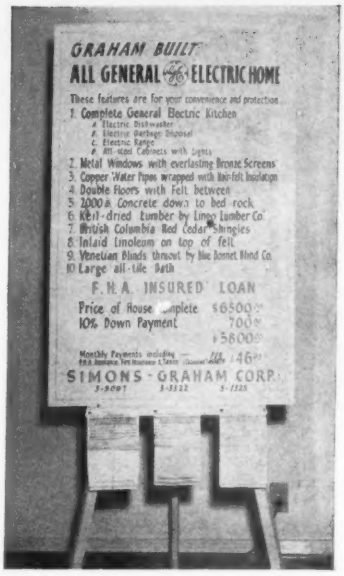
Groundwork was completed and development started the middle of last year by A. P. Simons, developer of the project. Up to March 1 of this year, some two dozen houses had been completed or were under construction, practically all of them being sold before completion. It is expected that the entire project will be completed within three years. Prices range from $6,500 upward, the majority being in the $6,500-$7,500 classification.

The experience of Mr. Simon proves that Certified Adequate Wiring helps to sell houses, and quickly, too. Dallas citizens are showing their appreciation of all-electric kitchens and up-to-the-minute house wiring by buying, the best possible proof that could be offered that it pays to give attention to the electrical features of a new house.

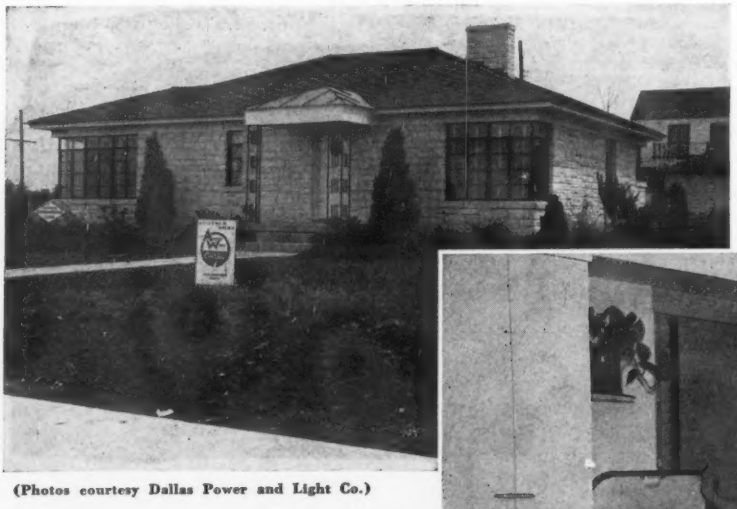
Kitchen equipment includes electric sink and dishwasher, Disposall, electric range, electric refrigerator, and all-steel storage cabinets with automatic interior lighting. Other important house features include scientific lighting equipment installed to meet seeing needs in each of the various rooms, protective flood-lighting of backyard areas, and electrical facilities for home cooling which the purchaser may adapt to attic ventilation or air conditioning.

Each "Simons-Built" house in the subdivision will receive an A-W certificate. This gives prospective purchasers evidence that the electrical wiring system, hidden within ceilings and walls, is capable of meeting both present-

(*Continued on page 50*)


GRAHAM BUILT
ALL GENERAL ELECTRIC HOME
These features are for your convenience and protection
1. Complete General Electric Kitchen
a. Electric Dishwasher
b. Electric Garbage Disposal
c. Electric Range
d. All-steel Cabinets with Lights
2. Metal Windows with everlasting Bronze Screens
3. Copper Water Pipes wrapped with Asbestos Insulation
4. Double Floors with Felt between
5. 2000 lb. Concrete down to bed-rock
6. Kiln-dried Lumber by Lingo Lumber Co.
7. British Columbia Red Cedar Shingles
8. Inlaid Linoleum on top of felt
9. Venetian Blinds thruout by Blue Bonnet Blind Co.
10. Large all-tile Bath
F.H.A. INSURED LOAN
Price of House complete $6500
10% Down Payment 700
$5800
Monthly Payments including FHA Insurance 46
SIMONS-GRAHAM CORP.

Placed just inside the front door where the visitor will see it immediately upon entering, this sign emphasizes some of the plus features of Dallas' newest all-electric homes. Note that the electric kitchen heads the list. Another sign in front of the house indicates that it offers "Certified Adequate Wiring."



(Photos courtesy Dallas Power and Light Co.)

Adequate wiring and all-electric kitchens are advertised features in the houses being constructed in Lakewood Estates, a new subdivision in northeast Dallas, Texas. The project calls for 250 homes to be constructed in the next three years. The developer of the project, A. P. Simons, is playing up the electrical features very strongly in the promotional literature on these new homes. Note the sign outside of a typical house directing attention to its "Certified Adequate Wiring."

Not only does the new night lighting of Sanford Stadium, University of Georgia, at Athens, eliminate the wilting of players and spectators under broiling afternoon sunshine, but it brought the Athletic Association a gratifying increase in ticket sales at the first night game. The installation, shown at left, includes eighty 1500-watt Mazda C lamps.

Southern Stadiums Get Night Lighting

THE Washington Senators in 1941 became the ninth major league baseball club to light their stadium for night playing. A 1,500,000-watt floodlighting installation for Griffith Stadium, in Washington, D. C., has just been completed. This newest major league system will employ 740 floodlights supported on eight towers rising to a height of 150 feet above the playing field.

Four of the towers were erected on top of the grandstand, two are free-standing in the right outfield, and two rise through the bleachers. Two of the grandstand towers are located opposite home plate, and two beyond third and first base on the left and right field pavilion. The two towers opposite home plate carry 54 floodlights each. Those at first and third carry 108, and the outfield towers support 108 floodlights each. Each of the 740 lights are directed on a definite area on the playing field to obtain the correct light distribution.

The individual floodlights are rated at 1,500 watts each but as the system will be operated at 10 per cent overvoltage, the lights will burn at about 1,750 watts. This is a measure of economy. To operate 105 volt lamps at 115 volts, as in the Griffith Stadium system, means that the light output is increased 35 per cent while raising the consumed wattage only 16 per cent. This is standard practice when a lighting system is operated for the comparatively short time required for a night game.

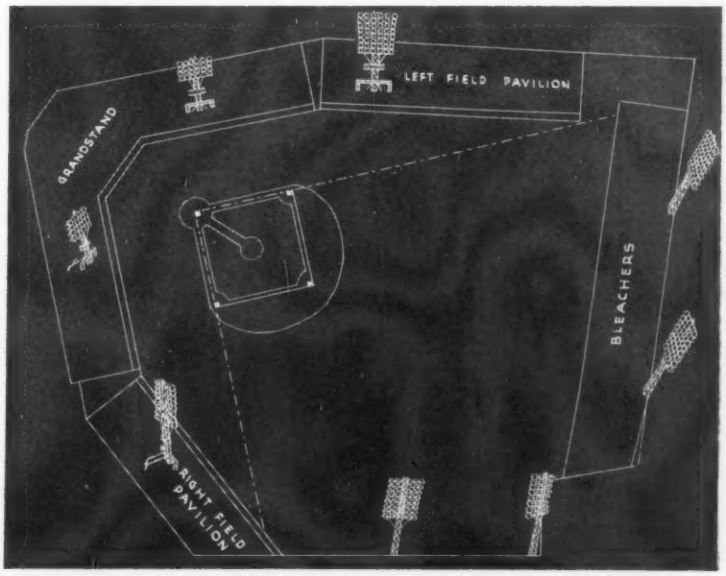
Griffith Stadium is the sixth successive major league park to be lighted by the system developed by Westinghouse engineers and the ninth lighted since the first major night game at Cincinnati in 1935. National and American League parks now lighted are Forbes Field, Pittsburgh; Polo Grounds, New York; Comiskey Park, Chicago; Sportsmans Park, where both St. Louis teams play; Shibe Park, used by two Philadelphia clubs; Cleveland's Municipal Stadium; Crosley Field, Cincinnati; and Ebbetts Field, Brooklyn.

The Belmont Iron Works fabricated and erected the 150 foot steel towers. Harry Alexander, Inc., electrical contractors and engineers, of Washington and New York, were in charge of the installation of the lighting equipment.

Another outstanding stadium lighting installation for night games was completed recently for Sanford Stadium, on the University of Georgia campus.

Realizing how wilted both players and spectators become after an afternoon under a broiling sun, the University Athletic Association recently installed $10,000 worth of lighting facilities. The Hersey Equipment Company, of Columbus, Georgia, installed both the lights on the field and those around the stadium.

The installation consists of 80 floodlights which are mounted on



Eight lightstands carry 740 floodlights to illuminate Griffith Stadium for the Washington Senators' night baseball games in 1941. Westinghouse engineers state the towers, each 150 feet high, will throw 180,000,000 candlepower on the playing field.

10 poles and directed on the playing field. Each floodlight is equipped with a 1,500-watt PS-52 Mazda C lamp.

A 10-kw CSP transformer is located at the base of each 60-foot pole. Underground wires feed a primary voltage of 2,300 volts to the transformers. From each transformer, a section of conduit extends up through the pole to the lights.

The voltage at the lamp sockets is approximately 10 per cent above that of lamp rated voltage which increases the light output 35 per cent over normal operation.

Grounding Rules of The 1940 Code

(*Continued from page 13*)

the higher impedance path.

Suppose separate neutrals had been used for the primary and secondary systems and only the primary neutral was grounded. Under the above described fault condition the fault current would now flow from the primary line, into the secondary, but through the service, into the branch circuit equipment, then into the branch circuit neutral back to the secondary neutral, through one half of the transformer winding, back to the fault connection. All the secondary wiring and equipment is raised to the primary line potential or a value slightly less than this primary voltage to ground.

The secondary system wiring has a maximum insulation value of 800 volts and much of the equipment is only rated for 250 volts. This sudden rise in voltage will break down the equipment insulation due to a tremendous increase in temperature. In most cases this temperature rise will ignite any combustible material adjacent to or in the vicinity of the wiring system or equipment. In the event the main service switch is open or no equipment is in circuit at the time, and for some reason the entire system is capable of maintaining the full primary voltage (a condition remotely possible in some knob and tube installations) any person contacting the secondary system or equipment will be severely injured due to this high primary voltage superimposed on the secondary wiring system.

If the accidental connection occurs, as at "B", on the secondary branch circuit, as for example, by a breakdown of the "hot leg" to some water piping within the building, then the combination of the service neutral ground and this accidental ground on the phase wire will result in a direct short circuit on the customer's wiring system and will "blow" his branch circuit protective fuses or circuit breakers. This, in effect, illustrates the second point stated above relative to the limiting of the maximum potential to ground due to the normal voltage of the system.

Direct Current Systems

Direct current systems which supply *interior wiring systems* must be grounded. If the system is two wire, then for circuits operating at 300 volts or less between conductors the system must be grounded. However, where the two wire d-c system supplies industrial equipment such as motors, heaters, etc., in a limited area, then the system does not have to be grounded. The circuit must nevertheless have a permanently connected ground detector to give an indication of all accidental grounds.

It is further recommended that all two-wire circuits operating above 300 volts between conductors be grounded if a proper neutral point can be established. The voltage from this neutral point to other points on the system, however, must not exceed 300 volts, and if this value is exceeded when the ground is made, then the circuit ground should be disconnected. An isolated 550-volt circuit feeding a two-wire overhead trolley system may be effectively grounded by feeding into a balance coil with a grounded mid point.

All three-wire d-c systems supplying interior wiring must have the neutral conductor grounded. It should be noted at this point, that, while grounding is required for d-c systems, supplementary rules in a later section (2522) prohibit the grounding of the individual d-c services and permit such grounding at only one point on the system, i.e., at the supply stations. The individual service ground and other grounds on the d-c system are eliminated in an attempt to keep electrolysis current action to a minimum.

All *secondary* alternating current systems supplying interior wiring must be grounded if the voltage to ground can be kept to a maximum of 150 volts. All higher voltage a-c systems which will not exceed 300 volts to ground are recommended to be grounded. All other a-c systems may be grounded.

Electric crane circuits in class III and class IV hazardous locations, where the crane operates over combustible fibres must not be grounded. Furnace circuits and, under certain conditions, circuits operating at less than 50 volts do not have to be grounded. However, these latter circuits must be grounded if the circuits are

(a) supplied by transformers on systems rated at more than 150 volts to ground
(b) supplied by transformers from ungrounded systems
(c) run overhead outside of buildings

Under any of the above conditions it is possible, due to a transformer or line breakdown, for a voltage above 50 volts to be imposed on these low voltage systems.

Drying Lamp Use Extended in Oklahoma

(*Continued from page 17*)

shop, or even suspension from the ceiling; economy because of long life of lamps and low cost of original investment for equipment.

The assemblies can be built to specifications which will meet the requirements of the particular drying or finishing job. The lamps can be compactly arranged in the most effective groupings about the surfaces to be dried.

Scores of uses are being found for the infra-red electric drying lamps in addition to those already mentioned. These include: drying or baking of enamels on such manufactured articles as refrigerators, floor furnaces, ranges and hot water heaters; applying finishes to furniture or heating of asphalt-impregnated fiber board to increase its pliability, and painting or varnishing doors, particularly in large office buildings, where it is desirable to save time by removing the doors from their hinges after office hours to a drying room and remounting them fully dried before office hours begin the following day.

There are two broad general types of drying lamps available. One is represented by the 250-watt, R-40 bulb lamp having an inbuilt reflector. The other type requires a separate reflector of Alzak aluminum or of gold-plated metal. Flexible sockets which may be used in connection with the drying lamps permit adjustment at various angles so that heat may be concentrated on any desired surface.

INFRA-RED DRYING LAMPS OFFER CONTRACTOR OPPORTUNITIES

Oklahoma Gas & Electric Company lighting engineers cooperate with contractors and supply men in promoting sale and demonstration of this new electric lamp application.

By O. D. Hall

A COMPARATIVELY new development in the fast-moving electrical industry is use of infra-red electric drying lamps. The many practical applications of these lamps indicate interesting sales possibilities for electric utilities, contractors and dealers.

First reported use of infra-red lamps for practical purposes was in 1935 where they were successfully applied for drying automobile body finishes. They were first introduced into Oklahoma City during the fall of 1940 and assemblies of these lamps are now being utilized in 18 automobile paint, body and repair shops in that city.

The lamps involve the principle of heating material by radiant energy utilizing infra-red light rays in electric lamps especially designed for the purpose. Because solvents to be dried are translucent, or practically transparent to infra-red energy rays, the material does not undergo a mere surface drying but dries uniformly throughout its cross section. When the enamel or finish is applied to a metal surface, it dries from the metal out, leaving a smooth, uniformly dried finish.

The lighting engineering department of the Oklahoma Gas and Electric Co., of Oklahoma City, operating in more than 200 cities and towns of Oklahoma and eastern Arkansas, gathered the information and made the original demonstrations which introduced infra-red electric drying lamps in Oklahoma City and the state. Working through electrical contractors and supply men, the utility aided in demonstrating the practicability of infra-red lamp assemblies, starting in automobile paint, body and repair shops.

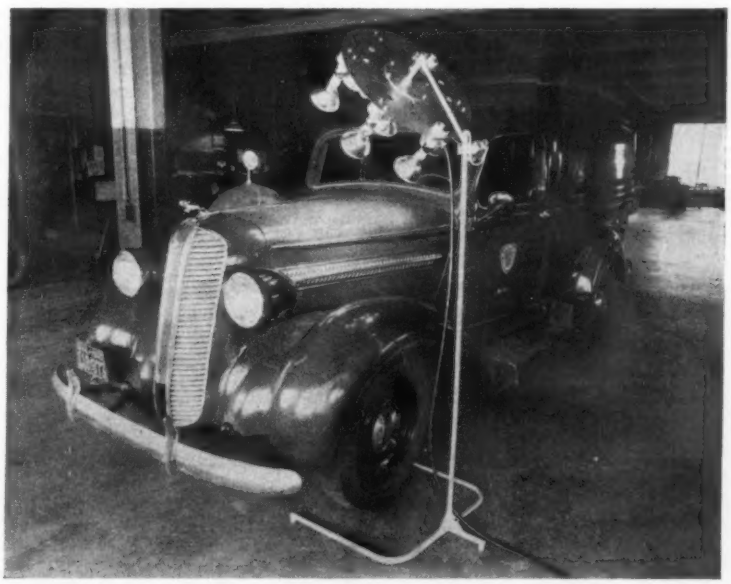
The electric utility works directly with the prospective customer, or indirectly through contractors when desired, emphasizing as much as possible the practical operations and value of the lamps, while avoiding as much as possible purely technical explanations or discussion which may confuse customers and divert their minds from buying the equipment.

The lighting department draws diagrams or plans and furnishes them to the electrical contractor or customer. Once in operation, the assembly creates a new demand for electric drying lamps and other equipment, which, of course, helps both contractors and supply men.

Average Oklahoma City assemblies have been five to seven lamps, 250-watt, R-40 types. Use of the lamps thus far in Oklahoma City has been confined largely to automobile shops but installations are being planned for a large battery charging shop and for use of beauticians in drying fingernail polish. The fingernail polish drying lamps are of 60-watt capacity, mounted on goose-neck standards so that the light-radiating surface of the lamp is directly over the hand of the customer. Her nail polish can be dried by this process in three minutes, whereas a much longer time is required under ordinary processes. The polish wears off much slower, according to experts, when infra-red drying lamps have been used.

Principal advantages of infra-red electric drying lamps, which electrical contractors and dealers may present to their prospective customers, include: fifty to eighty per cent faster drying time; smoother, more durable and more beautiful finish; greatly increased volume of output, making for better satisfied customers; compactness and mobility of equipment, thus saving floor space and permitting use in any part of the

(See page 16, at left)



The seven lamps in this assembly, used in an Oklahoma City garage, are placed on a circular disc approximately 28 inches in diameter. The flexibility of this unit permits drying of top of hoods as well as fenders.

Selling the Low-Use Customer

This problem calls for a strong campaign emphasizing customer benefits. The low-use commercial customer can be sold on the profit possibilities of electric service.

C. L. Osterberger*

General Sales Manager
Louisiana Power & Light Company
New Orleans, La.

FOR MANY years our industry's business has steadily grown and on the whole, a creditable job has been accomplished. Today, however, we find our path beset with obstacles — these obstacles vary greatly in character and in magnitude and have been increasing at an accelerated rate. Just where they will stop, most of us hesitate to say. We do know that over the past years, we have seen rates continue their rapid *downward* trend and, at the same time, have witnessed the sharp *increase* in all items entering into the cost of doing business — and the end is not in sight.

This situation has caused utility management to look to its sales organization for a better sales job as a partial solution to this problem. By a better sales job is meant selectively selling more and more profitable services to more and more people for more and more hours during the year at less sales expense. This increased use, if it is to be lasting, must be profitable both to the customer and the company alike. Such selling requires good salesmanship and skillful use of strong, appropriate sales appeals, emphasizing *customer benefits.*

For many years utilities have watched the relatively slow general acceptance of modern electric utility services and at the same time pondered over the large number of low-use or "unsold customers" in practically all classes of service. We have generally lamented the fact that so many customers used so little service, but only in recent years have we given much time and study to fact finding.

Analyses that have been made by various utilities have shown that from 1/3 to 1/2 or even more of the commercial customers are low-users and are therefore unsold on the profit possibilities which modern electric service offers them in their offices, stores, shops and other commercial places. This being true, this natural question arises: *What are we going to do about it?*

Before this question can be properly answered, two major problems present themselves which must be analyzed as part of the main question. They are:

(1) Why don't they use more service?

(2) Why are we interested in low-use commercial customers?

Let us now look at the first question which covers basic obstacles: Why don't they use more service? Some of the answers that obviously present themselves fall into four general classifications as follows:

(1) Environment, inertia and special circumstances;
(2) Inadequate or ineffective sales promotion;
(3) Inadequate or ineffective sales contacts; and
(4) Limitations due to equipment design or availability.

The first group pertains to the customers themselves — people. Here we analyze all of the reasons why usage is low, from the human standpoint. Such considerations as lack of ambition, information, imagination and inability to judge relative values are involved. False impressions that electricity is expensive must be overcome. Low business standards may prevail in the community and no good nearby examples of liberal use in small establishments exist. Then, too, there is often a natural antipathy toward the regular monthly service bill plus a natural antagonism toward utilities and corporations. Fixed habits are hard to change but they must be changed. The customer may be broke and just hasn't "closed the shop." Wiring may be inadequate and neither owner nor renter is willing to spend any money. The customer may be of low intelligence and completely satisfied with everything "as is." There may be little or no competition to step up his standards.

Suffice to say, many of these human barriers can be removed by personal contacts and good salesmanship.

The second group of obstacles, inadequate and ineffective sales promotion, is likewise large.

Statistics of Louisiana Power & Light Company
(As of December 1939)

Total Towns & Communities Served (Incl. 12 Wholesale)	263
Number of Towns Having Population 2,500 or Over	16
Largest Town (Population)	9,600
Total Number Electric Customers	45,463
Number Commercial Electric Customers	7,007
Number Commercial All-Service Salesmen	7
Number of Customers Per Salesman	1,001
Miles Distribution Lines (13 kv. & Under)	2,357
Number Commercial Customers Per Mile of Line	3.0
Use Per Average Commercial Customer, 12 months ended Dec., 1939	2,513 Kwh
Revenue Per Average Commercial Customer, 12 months ended Dec., 1939	$125.72
Per Cent of Customers Using Less than $5 per Month	48%
Number of Customers Using Less than $5 per Month	3,154
Average Consumption per Year of This Low-use Group	339 Kwh
Rate of Increase of Commercial Customers	6.8% per year

*Adapted from an address presented before the Annual Sales Conference of Edison Electric Institute, in Chicago, April 1, 1941.

In analyzing this problem, we should critically view our sales promotional and advertising program. This important field of modern utility selling may not take into account the low-users' problems, requirements or viewpoint. The media may all be designed for the better users. Perhaps it does not present strong, positive sales appeals to this large group of customers. This material may be "over their heads."

It is possible that we have neglected the low-user field entirely. We can be certain that we have not sold this vast group the many practical, inexpensive uses of electric service and how these services will help them make more money.

It is necessary to carefully check all sales promotion and advertising material to see whether it is suitable for low-use customers. Printed salesmanship, simple visualizers and demonstrations will help sell low-use customers.

The third consideration, inadequate and ineffective personal sales contacts, is most important. This grouping includes all personal sales contacts with the customers.

Possibly the salesman is not calling on all customers. He may not be properly trained, and if he is trained, he may not tell the proper sales story. The customer may have been passed because the salesman judged him "too poor to buy" or the place just didn't look like anything. Or, if the call was made, the service and its value and cheapness were not sold.

Infrequent sales contacts may be responsible for many "low-users."

The salesman may not understand the necessity of "doing something" about his low-use customers.

Here again, we find a multiplicity of sales problems, but a planned systematic sales coverage and sales training program, plus adequate man-power, plus adequate supervision, seems to offer a partial answer.

The fourth problem, limitations due to equipment design or availability, is a knotty one. Much of the equipment available is too expensive for low-use customers. In many cases, no equipment is available at all. The wiring is nearly always inadequate. Service facilities for keeping the equipment operative may not be available, or if available, is too expensive.

Dealers may not be available, or if available, their salesman may not care to sell small items. The unit sales price is often too low to interest a commission salesman.

Whether the utility merchandises commercial equipment, or not, its a cinch that a "low-user" will remain a "low-user" unless, after having decided to buy the service, he is given an opportunity to conveniently buy inexpensive utilization equipment. It is therefore essential that we make it easy and convenient for these customers to secure proper equipment.

This is only a partial analysis of the elements which make up the answer to the original question: Why don't they use more service? Perhaps they are sufficient to stimulate further thought on this major commercial sales problem. To these considerations, there should be added those local problems that must of necessity be incorporated in a long range low-use customer sales program.

Now for the second question: Why are we interested in low-use commercial customers?

First, we have so many of them. As has been pointed out, records show that as many as 1/4 to 1/2, and even more in some cases, of all commercial customers are low-users. In many cases, the utility has considered all customers whose cost to serve exceeds or equals the monthly service bill as low-use customers. Can you picture any other business carrying as many as half of its customers on its books at a loss or at no profit? These customers are, however, potentially valuable in that they will want to buy these services from our privately owned utility companies.

Third, since these customers are already on the lines and the investment for service to them has been made, they offer the best possibilities for selling to increase net revenues. Furthermore, the additional energy sold to them will be bought on the top step of the rate.

Fourth, the low-use customers, because of their limited use and lack of appreciation of the value of the service, are more likely to become dissatisfied with the monthly service cost. Their limited use naturally yields limited benefits. Dissatisfaction usually arises in this group.

Fifth, low-use customers offer the sales organization opportunity to "sharpen its wits" and render a worthwhile service to customers and company alike. The need is great and the time to act is *now.*

I have no "cut and dried" answer and I do not know of anyone

(*Continued on page 48*)

Tell Them, Show Them, Sell Them—It Pays!

With these words Mr. Osterberger summarizes the suggestions he presented at the recent sales conference of the Edison Electric Institute on what to do about the low-use commercial customer:

(1) The low-use commercial problem is a major one. Its solution is difficult. The job is a continuing one, worthy of our best efforts.

(2) Before planning a program, it is necessary to carefully analyze the market. First, get the facts.

(3) Commercial low-users can be sold by applying modern sales tools and planned methods, involving both personal contacts and the mass sales approach.

(4) Lighting offers the greatest sales opportunity for increased profits to both customers and company.

(5) Low-use customers can be sold more liberal usage at very reasonable sales expense.

Results Obtained in Low-Use Commercial Customer Campaign

	1939	1940	Increase	Per Cent Increase
Number of Unsold Customers	2,637	2,390	—246	—9.36
Kwhr Sales to Unsold Customers	875,190	1,082,134	206,944	23.64
Revenue from Unsold Customers	$85,232.16	$95,272.72	$10,040.56	11.78
Kwhr Per Unsold Customer	331.88	410.36	78.48	23.64
Revenue Per Unsold Customer	$32.32	$36.13	$3.81	11.78

MERCHANDISING MEMOS

Spotlighting some pointed appliance sales suggestions

By Roy A. Palmer
Merchandising and Advertising Manager, Duke Power Company, Charlotte, N. C.

ELECTRICAL water heaters are not easy to sell. While people like to have hot water available at the turn of the faucet, they still haven't accepted generally electrical water heating. Some think it's too expensive; some think it isn't practical; and a great number of electrical customers haven't given it any consideration at all—probably because no one has convinced them that electricity can provide hot water quickly, constantly and economically.

Remember when electrical refrigeration was in its pioneer days? Engineers from the manufacturers were sent to talk to groups of salesmen who had been selling irons, washing machines and vacuum cleaners. They brought with them charts showing phantom drawings of compressors, evaporators and refrigerant lines. Long, detailed explanations were made telling how the whole thing worked.

No doubt that was a good thing, because many salesmen of those days recall how some housewives admitted that they were not so foolish as to believe that such a contraption could create ice through a wire, and perhaps it helped the salesmen learn something about the mechanism. But it didn't take long for everyone in the game to realize that the things that would sell electric refrigerators were the *advantages* of this new device, not its engineering features.

So it is today with electric water heaters. While the engineering features are much simpler than those of the refrigerator, the customer nevertheless doesn't give a hoot about them. Nine out of ten people who own cars aren't particularly interested in what's under the hood — performance and appearance are much more important in their mind. A water heater can't claim much attention for its appearance. It's face and figure wouldn't win many prizes at a style show. But — can it provide hot water low enough in cost so that Mr. Average Citizen can afford it? Will there be sufficient hot water for all members of the family for the Saturday night bath? Those questions and others similar to them must be intelligently, honestly, and convincingly answered by the salesman.

I know several successful salesmen who have been selling electrical water heaters this spring. One of the most successful of these has made a list of his prospects. Before calling on them he makes sure that he knows how many are in the family, what are their habits and circumstances, when do they have a pay day, and similar facts, which will help him to formulate his sales story and assist him in his approach. He is thoroughly conversant with the water heating rates in layman's terms. He has obtained permission from satisfied customers to use their names and the actual cost of operation of their water heaters. He learns whether or not there are servants who might be wasteful of hot water. He has learned how electric heaters should be installed so as to guard against loss of heat which might mean excessive cost to the customer. He is able to give the customer a barrage of uses and advantages.

Then another point which contributes to his success: each day he is at the office before opening time checking over his prospect list planning with care every call for the day. By 9 o'clock he is on his way to his first call. He is constantly trying to omit lost motion and wasted time. He knows that there is gravy for him among his water heating prospects. He knows that a certain number of them can be sold, and that as his volume of sales grows so will grow his prospect list and customer acceptance of electrical water heating.

There are other salesmen in the same organization who aren't so successful. They are waiting for prospects to come to them, either direct or through tips, the most of which are duds. They haven't taken the trouble to find out costs from satisfied customers. They don't gather the facts about a prospect's family before making a call. They are waiting for a better price, a trade-in proposition, or some special inducement. The mid-morning coffee or soft drink takes precedence over trying to find the housewife at home.

No, electric water heating is not easy to sell. But it can be sold!

If you are an electric water heater salesman and your sales aren't clicking, try preparedness, planning and work. They're wonderful things!

SALES JINGLES
YOU CAN TELL A WINNING SALESMAN WHO IS "RIGHT UP ON HIS TOES."
BY OBSERVING HIS APPAREL—WHERE HE FIRST WEARS OUT HIS CLOTHES—
NOW BILL WALKER IS A WINNER—AS A SALESMAN, PAGE ONE NEWS—
AND IN WILLIAM'S CASE THE WEAR AND TEAR SHOWS UP FIRST IN HIS SHOES—
BUT JOHN SITTER IS A LOSER—YOU CAN TELL IT AT A GLANCE—
FOR THE FIRST THING JOHNNIE WEARS OUT IS THE BOSOM OF HIS PANTS—

Water Systems Council Cites Dealer Opportunities

IMPROVED business conditions throughout the nation are providing the best opportunity for the sale of electric water systems that aggressive dealers have ever had, says the Electric Water Systems Council.

Citing the huge expenditure for national defense, the Council points out that increased payrolls mean growing power to buy the products of the farm and mill. The stimulating effect of the expenditure of fifteen billion dollars for national preparedness will be felt throughout the United States, even on the most remote farms.

The total of farm income plus government payments will exceed $9,250,000,000 for 1940. The cash total is the largest since 1929. Actually, due to the lower index number of prices paid by farmers now as compared with 1929, the present income has a buying power $200,000,000 greater than 1929 or the largest in the history of American agriculture, with the exception of 1918, the last year of the World War.

All of which is good news for the water system dealer, the Council points out. Water system sales are up 10 per cent over 1939 and 27 per cent over 1938. The year 1940 is the best in the history of the water system industry.

Opportunities for profitable sales of pumps in suburban communities, too, are unprecedented, the Council says. Much of the so-called defense housing, particularly housing for workers employed in power plants, is in small towns or on the outskirts of large cities where new markets for the sale of electric water systems to suburban builders will be created.

Preliminary census reports show that the most rapid growth in population has not been in the big cities but in water system territory, that is, the farm, the small town, and the suburban community "beyond the water mains" on the edge of the cities where people have built in order to escape high taxes.

While improved economic conditions are providing water systems dealers with attractive sales opportunities, the Council calls attention to the fact that the farm market is far from the saturation point.

Reports by private power companies indicate that only 20 per cent of the farmers along private utility lines have water systems.

Similarly the REA recently made its third annual utilization survey which indicates that only 15.3 per cent of farmers on new federally sponsored lines have purchased water systems. Consumers covered in this survey have had electricity available for an average of 13.6 months.

Thus both private and federal statistics point to a vast market along both new and old lines which now, with increased farm purchasing power, should challenge the resourcefulness of the dealer.

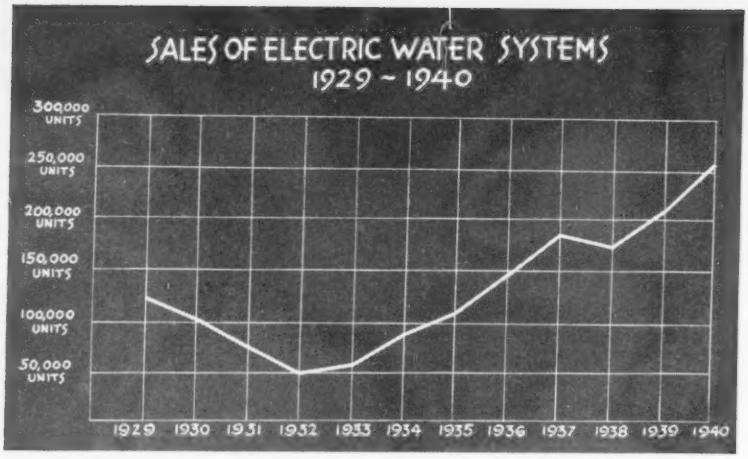
Particularly during the winter months, the dealer will have a splendid opportunity to tell his story of the advantages of running water on the farms, the Council observes.

It is during the winter that the disadvantages of an outdoor hand pump and outhouses are felt most keenly. It is at this time of the year, therefore, that all members of the farm family are in a most receptive mood for the presentation which an electric water system dealer knows how to make.

That this is the age of mechanization is provided by the sensational events in Europe. The alert water system dealer will know how to dramatize the lessons of mechanized warfare as they apply to the American farms.

Mechanizations of the farm water supply is merely an extension of the mechanization which

A recent survey of the Rural Electrification Administration indicates that only 15.3 per cent of farmers on new federally sponsored rural lines have purchased electric water systems, which indicates that there exists a tremendous market for this appliance among the remaining 84.7 per cent. Farmers have indicated a strong desire for radios and refrigerators, but the dealer who can present the dramatic importance of running water on the farm should have no difficulty in adding the electric water system to the farmer's list of essential appliances.



Electric water system sales reached an all time high in 1940

the American farmer has already adopted by equipping himself with high speed, pneumatic-tired tractors, combines, and other implements which reduce the cost of operations.

In addition, many farmers face a labor shortage, or at best, must overcome the conditions which made good farm hands hard to get. The farmer knows from reading his farm magazines and watching his neighbors outproduce him that he, too, must put his farm on a mass-production, and above all — labor-saving basis.

In this category, no other farm equipment saves the entire family so much labor as a dependable electric water system. It is not hard to convince a farmer of this fact. He has turned more and more to raising stock, feeding his grain and forage to hogs, cattle, sheep, and poultry.

This program makes more money for him and saves the fertility of his farm. Naturally it requires more water. That is the water system dealer's poportunity to sell a water system, from the standpoint of its dollars and cents value to the farmer.

And in addition to the appeal of increased profits, there are innumerable other motives which the dealer will know how to emphasize. The dealer will know how to point out that the farmer needs lots of water for the electric washer, the kitchen sink, showers, the bath, for sprinkling lawns and gardens, and for better fire protection with consequently lower insurance rates.

If he's a large stock raiser, he probably has a milking machine and a cream separator, which require lots of water for cleaning utensils. Then there are the dairies requiring still more water for the aerating system, the cooling and refrigeration plant, and washing equipment.

Six suggestions on "How to Sell Water Systems Profitably" are included in a recent edition of the dealers plan book issued by the Electric Water Systems Council and available to dealers on application to distributors of participating manufacturers.

These six suggestions as listed in "Open the Door to Greater Profits With Running Water" are:

1. Know your pumps.
2. Work with your electric service company.
3. Compile lists of prospects.
4. Visit prospects frequently.
5. Make recommendations clear.
6. Inspect installations occasionally.

The Edison Electric Institute, with manufacturers of water systems, is a joint sponsor of the promotional activities of the Electric Water Systems Council. Dealers are urged to keep in close contact with power companies so that accurate and up-to-date prospect lists may be made available to them.

Unique Radio Campaign Increases Console Sales

ANY DEALER who has given close attention to store operation problems will readily agree that one of the first essentials in successful merchandising is in recognizing opportunities and in following through such opportunities to a profitable conclusion. Such has been the experience of the Stowers Furniture Company of San Antonio, Texas, and the manner in which they have materially increased sales and have built up a greater appreciation and preference for more expensive radio models makes an interesting story. It is told by Royal P. James, merchandising manager for this firm.

"Early last summer when we were mapping out plans for disposing of the remaining last season sets and merchandising the new models which were soon due, we came across a sales condition that was far from satisfactory," Mr. James stated. "We found that too much attention was being given to the small table models—on which there is only a small profit, and in some instances a loss—and not enough to the console models on which we could enjoy a good profit with a substantial volume.

"From these observations, it was only too evident that more effort should be directed toward the sale of console models. So much had been said about the smaller models, however, that to educate the public to a preference for the higher priced radio became a difficult problem.

"After mulling over the matter, we realized that in the current popularity for phonograph records, we had an opportunity for building up interest in the combination sets — sets selling at the higher prices — which in turn would increase our sales volume and earn us a better profit at little or no additional effort.

"For the information of the reader, we merchandise five makes of radio sets: General Electric, Philco, RCA-Victor, Emerson, and Zenith.

"Our plan was to sponsor a sales campaign wherein one week would be set aside to advertising one particular make, and to follow this through until all makes had been featured. Console models were to

be given preference in all copy, although table models were to have some space.

"We opened this campaign on a Sunday with a two-color, full page ad in one of the local papers. This was followed by a four-column, column-length ad on Tuesday afternoon, a similar ad on Wednesday morning, and a final ad on Thursday afternoon.

"It was only too evident, however, that such activities would be but wasted money and effort if we did not have a good follow-up within the store. We supplied this by arranging window displays and interior decorations. We had meetings of our sales people, told them our plan, and asked their co-operation. And we arranged a distribution of souvenirs to those visiting the store as a means for building up interest.

"What was probably the most successful achievement in this respect was making miniature records of the voices of people visiting the store. These included recordings of children singing some little song that had been taught them, and of men and women making conversation that would provide their families with permanent records of their voices.

"When we were making our plans for this campaign, there was some question about our featuring only one make of radio at a time, but this proved very satisfactory. It did not, as some persons predicted, put the other lines temporarily in the background. It did bring people into the store where they could see and hear what we had to offer, and to select the make and style that most appealed to them.

"This campaign was sponsored during the most active radio period of the year. The first ad appeared on August 18, and during the succeeding days was supported by follow-ups. On the next Sunday, we came out with a full-page ad featuring another make, and this was supported in like manner by follow-up ads during the next week. This same practice was exercised in featuring the other makes, so that it was near the end of September before the campaign was completed.

"The timing of the campaign gave us innumerable sales tips, although, now that it is over and we can look back over what has been accomplished, we realize that it is not so much the time of the year as educating the people to a better understanding and appreciation of the more expensive sets.

"What were the results?

"Glancing back over our experiences of this period, there can be no question but what this has been the most successful campaign of its kind that we have ever promoted. There are several facts that will better serve to substantiate this statement, as follows:

"First, our volume of sales during this time was greater than at any other time within recent years.

"Second, our sales of console models increased from approximately 10 per cent of our volume to around 20 per cent.

"Third, our average unit sales figure increased from $31.25 to $56.95.

"Fourth, we have accomplished just what we set out to do: We have built up an appreciation, understanding and preference for the more expensive models; an appreciation, understanding and preference that will be reflected in more sales during the months to come.

"We have given closer attention to our selling, closer attention to our prospects, with the result that our sales have improved accordingly. We sell the table models in office buildings, hospitals, schools and universities, and other places in which a small radio is suitable. But in the families where real entertainment, and possibly the playing of phonograph records is an aid to a pleasant evening for the entire family, we go after the console business; and it is here that our results have proven most satisfactory."

Many appliance dealers have found phonograph records and record players a profitable side line—not only for the profit in these items themselves but because of the desirable store traffic which they create. Above, the record corner of Barney Miller's Radio Store, Lexington, Ky. Below, a salesman demonstrates a portable record player in the Virginia Specialty Shop, Richmond. Note the record sales counter in background.

View in Bentley's, electric appliance store, in Birmingham, showing prominence given to electric range displays. Grady Bentley, proprietor, is shown explaining features of the heating element to a customer. Below, ranges spotlighted in window display.

Follow Through on Prospects For Greater Range Volume

WHY haven't some dealers built up more volume in electric ranges?

At least one answer is furnished by the experience of Grady Bentley, proprietor of Bentley's electric appliance company in Birmingham and Bessemer, Ala. Too many dealers are expecting ranges to sell across the counter as refrigerators and radios are selling and they won't do it, at least not yet, despite their growing popularity.

Mr. Bentley and his staff haven't taken the attitude that the public ought to come in and get the ranges, that is, they don't depend chiefly on floor sales. Possibly there was one explanation for this. It happened that Mr. Bentley had a brand of refrigerators which wasn't going over so well. His refrigerator sales, therefore, were nothing to brag about, although other dealers were setting up new records in refrigerator sales.

So Mr. Bentley decided to concentrate on ranges, perceiving that other dealers were more or less overlooking this appliance while refrigerators and radios were going like hot cakes. The results speak for themselves, as he has been selling ranges by the carload and the story is out that he has just about set the pace in his city.

"We simply decided to follow through on every range prospect to the end and while this involved a lot of hard work, it explains the chief basis of our success," said Mr. Bentley. "The Birmingham Electric Company, which has a small army of home service workers in the field, supplied us with many prospects and we worked up others ourselves. We always made a personal call on these prospects and where possible brought them to our showroom for a direct demonstration. We have two of the better accepted lines, so that we did not meet any brand resistance as had been experienced to some extent in our refrigerator sales.

"We believe one of the best selling stories is the way in which the country is turning to electric cookery. We emphasize this considerably in order to convey the idea that cooking by gas is the old way and cooking by electricity the new way. And as a matter of fact this conception is rapidly taking hold, so much so in fact that we find most women favorable toward the electric range, although they may not be sure about the operating cost, or may demur at the first cost of the range itself.

"As to operating costs, we can truthfully say that not one customer to whom we have sold a range has come back to complain of the operating cost. That is convincing proof that rates are not too high."

As to the cost of the range, Mr. Bentley has the matter of a trade-in to offer as an attraction. He has a store in Bessemer and one in Birmingham for the sale of used furniture including gas ranges, and since he can dispose of them to advantage, he can offer an attractive trade-in. As a matter of fact, he can sell more

(Continued on page 48)

APPLIANCE Service

Short Cuts and Time Savers In Appliance Servicing

By Allen Parker

Knacks in Running and Flaring Copper Tubing

The service man who can make a nice looking refrigeration installation is envied by many of his fellow workers. Nothing improves the appearance of an installation more than having a symmetrical lay out of the refrigerant lines with good even bends. Many good refrigeration men cannot do this and say that the laying out and bending of the tubing is a knack or art that they have been unable to acquire, but here I disagree and say that with a little study anyone can do a good tubing job, with a minimum of worry about leaking joints.

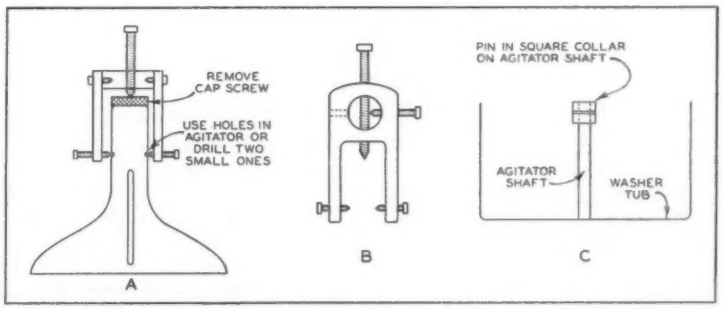
For instance soft-drawn copper tubing can be run in straight lines just as easily as hard drawn. The secret is never to bend soft tubing any more than is absolutely necessary and you will find the bends easy to make, because each time the tubing is bent it becomes harder and stiffer. Is it any wonder that the man who always unrolls more than he needs and then rerolls that which is left over finds a hard job on his hands when straightening the tubing for the next job? Neither should the coil be unwound by hand. Place the free end of the tubing on the floor and, rolling the coil away from you, distribute the hardening throughout the entire length and thereby leave the tubing soft enough for other necessary bends to be easily made.

In making short bends it is naturally better to use bending tools, but should they not be available or if space does not permit their use, a good job can be done with your hands. The proper method is not one quick motion, which is sure to collapse the tubing, but is to grasp the tubing with both hands with your thumbs about three inches apart and slowly bend the ends to you, and as you make the bend, continually slide the thumbs closer together. In this way, the pressure in bending is evenly distributed. Should the first operation fail to give a sharp enough bend then it should be repeated as many times as necessary. The bends would naturally not be held as close in making a sweeping bend but further apart and worked more slowly.

You may have had trouble in making flares by having the tubing split. This is not always the fault of the manufacturer as the hardening of the tube may have been caused by bending it previously too many times. Too much bending causes the tubing to crystalize.

To make a good leak-proof flare, always make your first requisite the use of a sharp cutting tool. A dull cutting tool may cause the end of the tubing to taper from excess pressure while cutting. Also, too much pressure can easily be applied when using a roller cutting tool as the ease in turning the tubing will fool you in the amount of pressure applied on the cutter. About one-quarter turn for each revolution of cutter is enough.

Some men still use a hacksaw when cutting tubing which always leaves a rough edge. This edge must be smoothed and squared up before a good flare can be made. This can best be done by clamping the reverse side of the flare block next to the edge of the tubing and dressing it down square with a fine file. After the tubing is cut, it is good insurance against a cracked flare to always remove the burr on the inside of the tubing with a knife or sharp instrument. In clamping the flare block on the tubing, allow enough tubing to protrude to give a flare width of one fourth of the diameter of the tubing. As a last requisite of a good flare, wipe away from the flare all copper dust and foreign particles, and you can almost be assured that it will not leak.



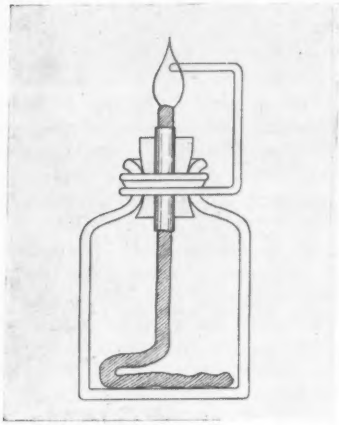
Easily Made Puller for Washer Agitators

The agitator on electric washing machines should be frequently removed and the tub cleaned out. When they are removed, the customer should be instructed to place a small amount of vaseline or other light grease on the hub of the agitator to prevent it from ever sticking. However, not many people do this, with the result that many agitators are broken in removing them, because the average person removes them by knocking them with a hammer while pulling on them.

I have found that they can be easily removed by a puller made in the shop. Also the same puller can be made to extract the pin from the collar on the end of the agitator shaft. Details of this easily made puller are given in the diagram.

Detecting Freon Leaks

Among service men, freon refrigerant has a reputation for being the hardest to keep from leaking from a system. Many methods of detecting leaks have been suggested. Soapy water applied to the tube connections and joints with a brush is effective as the gas will blow bubbles over a leak, but unless the copper connections are thoroughly cleaned after making the test, discoloration and corrosion are likely to occur. Light oil also can be used successfully by applying it with a brush.



The most accepted and probably the most sensible and practical method is the use of a halide torch. These torches burn alcohol and have a copper screw that is projected into the flame. The oxidization of the copper causes the flame to burn green when a small amount of freon is present in the air. A large amount of freon present will cause the flame to burn a bright purple. The sensitivity of the torch can be adjusted by the adjustment of the screw in or out of the flame.

Occasionally, there will be times when a torch is not available. For such an emergency, a home made substitute can be made up very quickly and inexpensively that will serve the purpose satisfactorily. A small bottle such as an ink bottle, or any bottle with a large opening and yet not having a body too large to be cumbersome, is required. A stopper to fit the bottle should have a hole punched in it so that about two inches of 3/8" copper tubing can be placed in it to act as a burner. A piece of soft cotton wicking large enough to snugly fit in the tube can then be pulled into the tube. The bottle can now be filled with methonol alcohol and the burner is complete. To make it sensitive to freon, a piece of bare copper wire can be wrapped around the bottle neck with one end projecting into the flame. In refilling the bottle with alcohol, take it out in the open or to a place where it is definitely known that freon is not present.

MOTOR Service

Connecting Diagrams for Lap Wound A-c Motors

By A. C. Roe

Railway Motor Engineer
Westinghouse Electric & Mfg. Co.

THIS article includes the three-phase, nine-lead, twelve-pole, two or four parallel, star and delta connecting diagrams. It also resumes the discussion on overvoltage and its effect on the operating characteristics of lap wound motors.

Figure 59 shows the twelve-pole, three-phase, nine-lead, two or four parallel star connecting diagram. This diagram has one permanent star connection which includes groups 14-16-18-32-34-36, while the two groups connecting to each line L_4-L_5-L_6 form a second external star for the four-parallel star connection.

In fig. 59, each of the nine leads have two pole phase group connections attached to it, and the internal star connection has six connections attached to it. This star jumper should always make a permanent connection between all six groups as shown.

Figure 60 shows the twelve-pole, three-phase, nine-lead, two or four parallel delta connecting diagram. This diagram has three line lead jumpers, A-B-C, that have four pole phase group connections attached to each lead. The other six leads have two connections each.

Thus to convert the delta connection of Figure 60 to a two or four parallel star connection, we first locate the ends of groups 14-16-18-32-34-36 and open the top connection on each group. Then we apply the star ring to connect these six points together.

This leaves groups 1 and 19 connected to the A line, groups 3 and 21 to the C lead, and groups 17 and 35 to the B lead, and we have a two or four parallel, nine-lead, star connection.

To change the star connection of Figure 59 to a delta, we first open all connections to the star ring from groups 14-16-18-32-34-36 and remove star jumper, then connect tops of groups 14 and 32 to the A line lead, tops of group 16 and 34 to the C line lead, and lastly connect tops of groups 18 and 36 to the B line lead, and we have a twelve-pole, three-phase, nine-lead, two or four parallel delta connecting diagram.

Thus a few simple changes permit one to convert the dual voltage diagrams from a star to delta, or vice versa. This same ease of change will be found to exist throughout this series of connecting diagrams. The accompanying table indicates method of connecting for different voltages.

Effect of Over Voltage

We can now resume our discussion on over voltage changes at the point where we left off last month. (It will be necessary to refer to Table 1 in the article appearing in the May 1941 issue of ELECTRICAL SOUTH, page 39.)

Starting torque varies directly

as the square of the applied voltage. Thus for 10 per cent over voltage, the torque increase is 21 per cent; while for 20 per cent over voltage the torque increase would be 44 per cent; and at 25 per cent over voltage, the per cent increase in torque would be 56 per cent.

Maximum running torque on over voltage is increased in the same ratio and percentage as the starting torque, and the same figures apply.

Temperature rise is reduced with motors operating on over voltage where the copper losses are reduced sufficiently to offset the increased core or iron losses. In most cases, where the motors are not overloaded on over voltage, the full load current required for the same horsepower is less, thus the total losses are less and motors will operate at lower temperatures.

Total losses are composed of stator and rotor copper losses, plus iron or core losses, etc. The friction or windage losses are not affected as the full load rpm is hardly affected. Thus the total losses are dependent upon whether the iron losses increase beyond the decrease in stator and rotor copper losses, etc.

Magnetizing current expressed as a per cent of the total voltage will increase in direct proportion to the square of the voltage. For motors in which the iron is worked well below the saturation point, or where

Table 1

Dual Voltage Connection For 3-Phase Star

For High Voltage: Connect A, B, and C to lines; connect L_4 to L_7; connect L_5 to L_8; and connect L_6 to L_9.

For Low Voltage: Connect A and L_7 to A-phase line; connect C and L_8 to C-phase line; connect B and L_9 to B-phase line; and connect L_4, L_5, and L_6 together.

Dual Voltage Connection For 3-Phase Delta

For High Voltages: Connect A, B, and C to lines; connect L_4 to L_7; connect L_5 to L_8; and connect L_6 to L_9.

For Low Voltages; Connect A, L_7, and L_6 to A-phase line; connect C, L_8, and L_4 to C-phase line; and connect B, L_9, and L_5 to B-phase line.

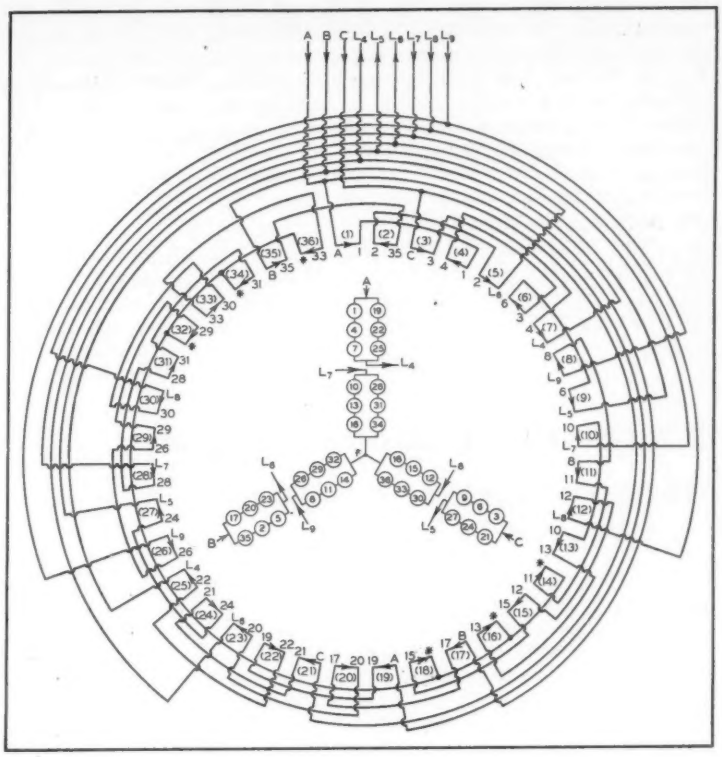


Fig. 59. Two or four parallel star connection for 12-pole, three-phase, lap-wound induction motor with three or nine leads.

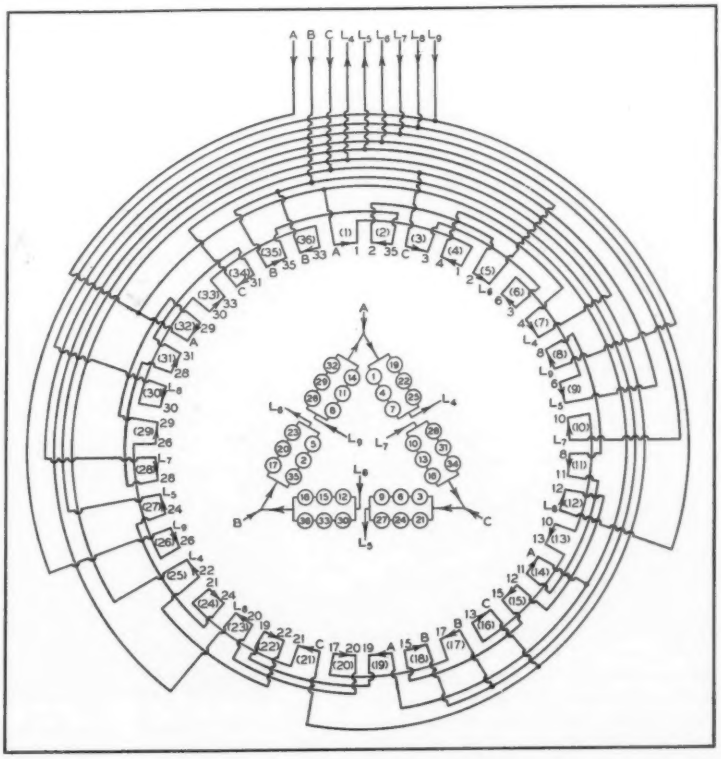


Fig. 60. Two or four parallel delta connection for 12-pole, three-phase, lap-wound induction motor with three or nine leads.

the magnetizing currents are increased from 23.6 to 28.5 per cent, the magnetizing current increase due to 10 per cent over voltage amounts to 20 per cent.

Starting current or locked current will be higher on increased voltage.

Full load current on over voltage will be less as indicated in table of last month's article. The full load current is equal to: (hp x 746) / (1.73 x E x Pf x Ef) where hp = horsepower; E = voltage; Pf = power factor; Ef = efficiency. Thus with lower line voltage, higher efficiency and power factor, the full load current must decrease. In applying this formula to a 110-volt motor reconnected to operate at 10 per cent over voltage, the new line voltage would be considered as 99 volts.

The next article will include the twelve-pole, three-phase, three-lead, three-parallel star and delta connecting diagrams; also a discussion on under voltage operation.

Fractional Horsepower Motor Load Tester

A NOVEL load tester for fractional horsepower motors is used to good advantage by the Central Electric Company, of Fort Worth, Texas, in testing small motors for general condition. Designed and built in the company's own shops, the device has proven most valuable in testing motors so small that accurate tests cannot be made with conventional test equipment.

The device operates through a pulley or V-belt off the motor, and the load placed on the shaft of the pulley is governed by an oil pump, manipulated by the tester. A gauge registers the oil pressure, and the load can be increased or decreased by increasing or decreasing the pressure. The current used by the motor is registered by an ammeter. Small motors may be mounted on a small table which is a part of the device, the tension of the belt being adjusted by means of a set screw. The fact that the company is able to accurately check fractional horsepower motors has brought considerable new business to them, since, while testing the small motors is not particularly profitable, the service acts as an inducement and a leader to further the firm's facilities with industrial users of power.

By skillful use of a wide assortment of power tools and liberal service with up-to-date testing apparatus, the Central Electric Company was able to increase its volume of electrical business in 1939 by 20 per cent over the previous year.

Under the management of R. E. Medford, assisted by J. M. Morgan, foreman, the company has accumulated a particularly good assortment of tools and instruments which enable them to cope successfully with any sort of problem which arises in the course of their electrical contracting and motor repairing business, and permits them to go far afield from the conventional run of service in some cases.

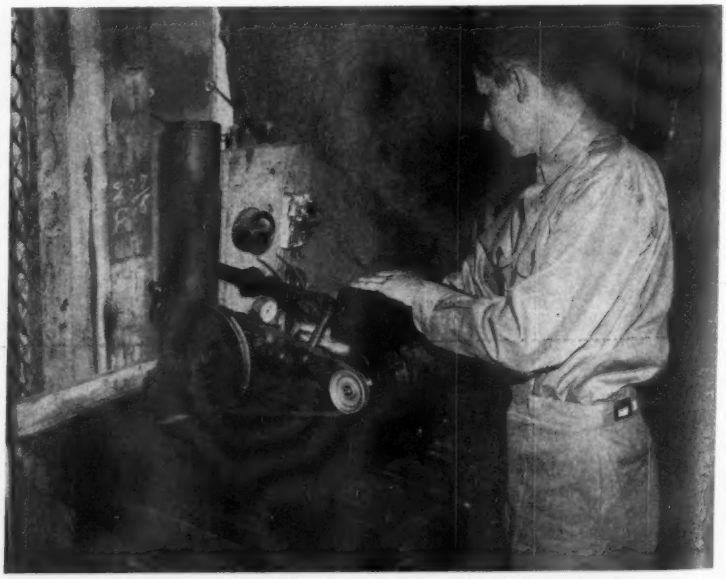
Typical of such equipment is a power taping machine used frequently and profitably by the firm in applying tape to armature coils after they have been wound. Automatically applying tape to the coil which is held in the operator's hands, the machine is run by a motor and controlled by a combination foot clutch and brake. The speed with which rewound armatures can be taped and turned out with this machine has greatly improved the Central Electric Company's position in the repair and rewinding field.

In the same process a coil shaping device comes into play, spreading the coil after it has been wound. The firm has two, one for small coils and one larger one which can also be used to apply any unconventional kink or bend to the coil when necessary.

A winder having both high and low speed spindles, each with three speeds, completes the equipment for winding coils; the operation is fool proof, with an automatic counter registering the number of turns made. This smoothly running production line for manufacturing armature coils has brought the company several desirable contracts when industrial motors failed and time was an important element in returning motors to service.

Other power tools employed by the firm are lathes, used in making bearings and turning commutators, electrically-driven drills, with bit capacity up to 1½ inches, and elec-

(*Continued on page 47*)



J. M. Morgan, shop foreman, Central Electric Company, Fort Worth, Texas, demonstrates the special fractional horsepower load testing device developed by this company. The motor to be tested is belted to a pump which pumps oil against a definite back pressure. The load on the motor may be varied by varying the oil pressure.

NEWS of the INDUSTRY

Simplified Wire Size Recommendation Considered by Electrical Industry

In order to facilitate the national defense program, the adoption of a simplified list of stock sizes of copper conductors has been proposed as a means of reducing unnecessary inventories of copper wire, thus effecting economies and conserving material, according to an announcement by the National Bureau of Standards, Department of Commerce.

The proposed simplified list was drafted at a general conference held under the auspices of the Division of Simplified Practice and is now being submitted to the industry, in the form of a Proposed Simplified Practice Recommendation, for consideration and acceptance.

The National Electrical Contractors Association, sponsors of the proposed recommendation, called attention to the fact that appreciable copper tonnages are now tied-up in inventories of slow moving sizes, mostly in the upper size range, whose place could more efficiently be filled, from an electrical stand-point, by smaller cables connected in multiple. They, therefore, suggested the adoption of a simplified list of 19 stock sizes of copper conductors in the range from No. 14 (American wire gage) to 500,000 circular mills, also that sizes larger than 500,000 circular mills be not carried in stock, but should be available only on order.

The general conference, called to consider this suggestion, consisted of representatives of manufacturers, distributors, users (including Governmental agencies) and others interested. After thorough consideration of the relative demand for the various sizes proposed for inclusion in the simplified list, the conferees unanimously decided that the demand for sizes No. 5 and No. 3 was not sufficient to warrant their retention. With this modification, the suggestions of the sponsoring group were drafted into a recommendation, to become effective for new production for stock, June 1, 1941, subject to approval by the industry.

Discussion at the conference emphasized the desirability of simplification, not only as a means of achieving the economies inherent in the production, distribution, and use of a simplified list of stock sizes, but also as a conservation measure. Already the pressure of defense preparations has required the invoking of priorities to relieve and forestall bottlenecks. This does not mean, according to the conferees, that non-defense industries must be deprived entirely of the raw materials they need, but it obviously does mean that those industries will have to go on rations. Those rations will have to be used wisely, not fabricated into varieties of products that are seldom demanded, and which, therefore, serve only to complicate the processes of manufacturing and distribution, swell inventories, and reduce the effective supply of materials.

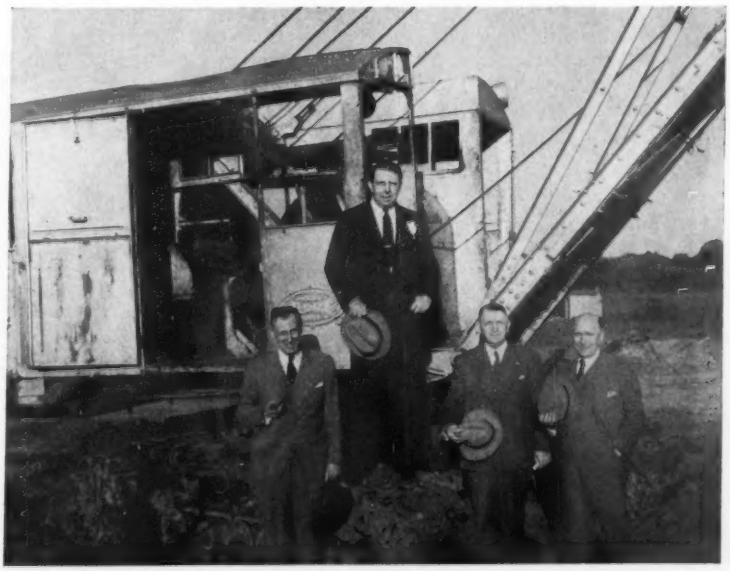
It was the consensus of the conference that, if manufacturers, distributors, and consumers will work together, voluntarily, on this and similar simplification projects, the sense of deprivation can be lessened, even in the face of rationing, and the national defense program will be facilitated.

Everyone who is in any way concerned with the production, distribution, or use of copper conductors is urged to secure a copy of the summary report of the conference and proposed recommendation, from the Division of Simplified Practice, National Bureau of Standards, Washington, D. C.

Power Commission Head Recommends Hydro Projects

Immediate construction of five hydro electric power projects on Broad river, north of Columbia, at an estimated cost of $80,000,000, was urged recently by Leland Olds, chairman of the Federal Power Commission. Looking into the future, Mr. Olds said, the output of the five projects, about 220,000 kilowatts, would no more than meet the minimum needs by the end of 1944.

The five projects suggested and their estimated power output were:



Governor J. M. Broughton, of North Carolina, stands on the shovel tread just after breaking first ground for the Carolina Power and Light Company's $6,000,000 addition to its Cape Fear generating plant near Moncure, N. C. With him, left to right, are L. V. Sutton, president and general manager of the company, W. H. Weatherspoon, vice president and general counsel, and S. P. Vecker, vice president. The addition will include two new 30,000-kilowatt generators.

Frost Shoals, 50,000 kilowatt; Lyles-Ford, 60,000; Greater Lockhart, 60,000; Greater Gaston Shoals, 30,000; and Clinchfield, 20,000. The Clinchfield project site is in North Carolina.

Mr. Olds, speaking at a meeting of federal and state power officials, suggested immediate action to get the power projects under way so that "this power can be utilized."

Governor Burnet R. Maybank named a five man committee to coordinate plans for development of the projects. Members were Tom B. Pearce, chairman of the board of directors for the Santee-Cooper authority; P. D. Barron, Lyles-Ford; John Sloan, Buzzard's Roost; Monson Morris, president of the Aiken Rural Electric cooperative, and D. W. Robinson of Columbia, former general counsel for the federal power commission.

Adequate Wiring Included in All Mississippi Promotions

The Mississippi Power & Light Company, cognizant of the need for adequate wiring and the increasing attention home-owners, builders, contractors and architects are giving it, now features adequate wiring in its promotions.

During the four months, March through June, it is estimated that 700,000 newspaper readers over the territory will read a 40-inch adequate wiring ad, reminding the new home builders to "install adequate wiring in your new home."

The Home Service Department in the spring campaign is cooperating with appliance dealers to the extent "that each cooking school of the Mississippi Power & Light Company to be conducted during the 'All Out for Progress' campaign will stress the need for adequate wiring."

The Home Service Department also cooperates with builders, and appliance dealers by calling on the new home builder and discussing the individual needs for each building while it is in the blueprint stage.

The Commercial Sales Department has as one of its major objectives in the program "to obtain the cooperation of all architects, contractors, and builders in specifying more adequate service facilities on all buildings being planned."

The Industrial and Residential Departments are stressing adequate wiring in their plans and objectives for the remainder of the year. R. S. McFarlane, of the Industrial Development Department, made a speech recently to an annual meeting of the Mississippi Lumber Dealers Association in which he stated that "the utility's draftsmen and engineers are cooperating with the lumber dealers in making wiring layouts for the dealers' standardized low cost home plans and have submitted wiring specifications to enable lumber dealers to see that adequate wiring is included in their specifications.

What's Being Said and Done in Washington

By Wilfrid Redmond

Curtailment of household electric refrigerator production may be asked by the Office of Production Management within 30 days, according to spokesmen of OPM.

Furthermore, it was freely predicted by defense production officials that no aluminum will be available for non-defense industries by some time in June.

The precedent for the curtailment possibility is the recent production cut of 20 per cent in 1942 automobile production agreed upon by manufacturers at the request of OPM. Other industries are on the program, and the refrigeration industry is next on the list, according to OPM officials.

The curtailment program has for its objective the curbing of consumption so that men, materials, and machines may be released for defense production. The program was in formation before the President asked for 500 additional bombers a month on May 5. Superimposed upon the already critical aluminum situation, this new defense strain is expected to hasten curtailment of non-defense production.

The aluminum situation is admittedly bad and rapidly getting worse. Defense industries were scheduled to use 90 per cent of total virgin aluminum production during May as against 75 per cent two months ago. Supplies of various grades of scrap are available but OPM officials are not prepared to say whether there is enough to go around among the industries which have non-defense priorities.

Two other blows have been aimed at electric refrigerator production by defense economists.

Leon Henderson recently proposed before the Ways and Means Committee that the excise tax on mechanical refrigerators recommended by the Treasury Department be greatly increased. Henderson did not specify what this increase should be in the case of refrigerators but he recommended that the tax on automobiles be increased to 20 per cent, and placed refrigerators in the same classification of items which compete with defense production.

The plan of using taxation to divert production for civilian consumption to the armament program was proposed by Jerome Frank over a year ago and is now being placed in operation.

It appears also in a plan recently revealed by the Federal Reserve Board to curb installment buying of items which compete with defense production. The Board announced a study had been completed and various mechanisms for curtailing consumer purchases had been explored. Proper taxing measures, it was stated, seem to be the most effective means of discouraging consumer buying. The Board announced that the plan was ready for Congress.

Tulsa Electric Code Killed After Objections

A flood of protests swamped the Tulsa, Okla., city commission and resulted in immediate rejection of a proposed new electrical code which has been in the making almost a year.

Commissioners asked that all interested parties meet and draft an ordinance suitable to all.

The code would have required all journeymen electricians to take examinations before obtaining city licenses and would have placed stricter regulations on contractors.

Leading the fight against the ordinance was Earl Sneed, secretary of a chamber of commerce committee, who listed many objec-

tions. He stated that the electrical ordinance committee that would be set up, composed of one electrical contractor employing union labor, one employing non-union labor, and the city electrical inspector, would not be representative because it would not include consumers or builders.

His committee objected to a clause creating the board of examiners because it does not set forth the method of appointment, times of meeting, nor how a chairman was to be designated, and was not sufficiently representative.

He also opposed provisions that require journeymen electricians, electrical contractors and elevator contractors to pay for examinations, while others (such as appliance repair men and maintenance workers) are examined free.

Principal objection, however, he said, was to a requirement that electrical contractors must qualify as journeymen electricians before they may obtain a license.

"Electrical contractors can hire all the journeymen electricians they want," Mr. Sneed said. "There is no necessity for them to obtain a journeyman's license, too."

Counter Cooking Equipment Promoted by Exhibit

The superiority of electricity as a cooking medium was compellingly demonstrated on the floor of the Texas Caterers' and Stewards' Food Show held at the city auditorium March 17, 18, and 19, when the Houston Lighting and Power Company erected a "life-size model" cafe, electrically-equipped throughout. The equipment included electrical deep fryers, coffee urns, grills, griddles and all items needed to operate a modern, quick-service cafe.

During the tenure of the show, coffee and sandwiches were served at frequent intervals, and salesmen were on hand to demonstrate and explain the various appliances to interested persons.

On the closing night of the show, a free serving of delicious, tender, golden-brown fried chicken, banquet-style, together with toast and french-fried potatoes all electrically cooked, was served to thousands who passed the "cafe". The aisle around the Houston Lighting and Power booth became so congested that a traffic officer from the police department aided in keeping the crowd in line for most efficient serving. And all this interest was evidenced in the demonstration despite a floor show in progress at the same time in the form of a beauty contest for waitresses and car-hops, on the stage of the auditorium.

Nearly 150 electrical dealers and their sales people, manufacturers' representatives, and wholesalers, assembled in the Dallas Power & Light Co. auditorium, Dallas, Texas, recently for an electric roaster demonstration. The meeting was a "kick-off" dinner for the 1941 electric roaster sales campaign of the power company and cooperating dealers. Meals were prepared in the electric roasters by the five girls on the stage. All visitors were given copies of "The Electric Roaster Dealer," an elaborately prepared brochure giving highlights on the sales campaign and outlining many ways of merchandising this popular cooking equipment. The meeting was arranged by and was in charge of Ray C. Dixon, residential sales manager.

Non-Tamperable Fuse Required in Chattanooga

Supply houses should stock the standard non-tamperable fuses and adapters to meet requirements of the 1940 National Electrical Code which has just been adopted by the Chattanooga, Tenn., city commission, according to William L. Williams, electrical inspector.

"The new code," says Mr. Williams, "is one of the most difficult of enforcement of any we have had heretofore. It has changed the carrying capacity of all wires from No. 8 up as well as the correction factor for room temperature and temperature limitations. Besides, there are 17 different type code letters for conductors. Keeping this straight will be a job within itself.

"In my opinion," continued Mr. Williams, "one of the best changes is the requirement of rigid conduit within the fire limits. This, with non-tamperable fuses, should reduce fires from overloaded cir-

This all-electric "life-size" cafe was erected on the floor of the Municipal Auditorium by the Houston Lighting and Power Co., during a food show staged by the Texas Caterers' and Stewards' Assn., to demonstrate electrical counter cooking equipment.

cuits. The present type of breaker in use by the Chattanooga Electric Power Board is classified as a non-tamperable fuse.

"Another good requirement is that commercial buildings shall always have a service and equipment large enough for the ordinary business house. It also gives the small house a break. Now a one-circuit job may use a single pole breaker and two No. 8 conductors for service switches and service conductors. On a two-circuit job a two-pole circuit breaker and three No. 8 wires may be used."

Anti-Strike Legislation Becomes Law in Texas

An "anti-strike violence" act was passed with overwhelming majorities in both Houses of the Texas Legislature within eight days after its submission and became a law immediately after it was signed by the Governor.

This new legislation is an act "making unlawful the use of force or violence or threats thereof to prevent or attempt to prevent any person from engaging in any lawful vocation and providing penalties for the violation thereof; making it unlawful for any person acting in concert with other persons to assemble and prevent or attempt to prevent by force or violence any person from engaging in a lawful vocation and making it unlawful to encourage and aid such unlawful assemblage thereof; defining the term "labor dispute"; making the provisions of this Act cumulative of existing laws; and providing a severance or saving clause; and declaring an emergency."

Eyes Right! . . . by Squier
LIGHT FOR THE EVENING GAMES OF GREECE AND ROME WAS PROVIDED BY BUNDLES OF FAT-SOAKED STICKS USED AS TORCHES. ROMANS IMPROVED THE LOOKS OF METAL AND POTTERY LAMPS BUT DID NOT IMPROVE ON THE BASIC IDEA OF LIGHTING WITH AN OPEN FLAME.
COPYRIGHT 1940 BY J.V. CLARKE
LONG KNOWN, CANDLES FIRST CAME INTO GENERAL USE IN CHRISTOPHER COLUMBUS' DAY ALTHOUGH THE POOR STILL USED THE CHEAPER OIL LAMPS.
ROISTERERS OF RESTORATION DAYS WERE LIGHTED HOME TO THEIR HANGOVERS BY SERVANTS BEARING TORCHES. STREET LIGHTING IS VERY RECENT. BEFORE 1850, ONLY THE BIGGEST CITIES EVEN TRIED IT.
ELECTRIC STREET LIGHTING MADE ITS FIRST U.S. APPEARANCE IN CLEVELAND IN 1879 WHEN CARBON ARC LAMPS WERE INSTALLED. EDISON LIGHTED A SECTION OF NEW YORK CITY THE SAME YEAR.
AH! DAWN!
POST NO BILLS
LIGHTING NOT ONLY STREETS, BUT LARGE PUBLIC FUNCTIONS, INCLUDING NIGHT BASEBALL AND FOOTBALL GAMES, IS NOW COMMONPLACE. ADEQUATE AND SCIENTIFICALLY CORRECT LIGHTING HAS PROMOTED MAN'S EFFICIENCY AND HAPPINESS IN EVERY BRANCH OF BUSINESS AND SOCIAL LIFE.

Mats of this series of lighting cartoons are available from the Better Light-Better Sight Bureau, 420 Lexington Ave., New York City.

Dallas Electric Club Visits New Dallas Plant

The Dallas Power & Light Company was host to members of the Dallas Electric Club recently. Lunch was served at the administration building of the company at its Mountain Creek steam-electric station, near Dallas.

Preceding luncheon, there was first a tour of the generating station, with guides taking groups of club members through the huge, modern plant. Then the visitors were taken over the mile-and-a-half long dam and watched operation of its large flood gates.

The Mountain Creek plant, completed about two years ago, is one of the country's most up-to-date steam-electric stations. It is tied in with the Dallas city system by two 60,000-volt transmission lines, bringing the company's Dallas generating capacity to 113,750 kilowatts.

Electricity in the News

Farmers using REA power lines may now be able to use these same wires for telephone service and a test is being made in Maryland. New inventions of youthful REA engineers make this possible and Washington dispatches say the device will be available at extremely low cost.

* * *

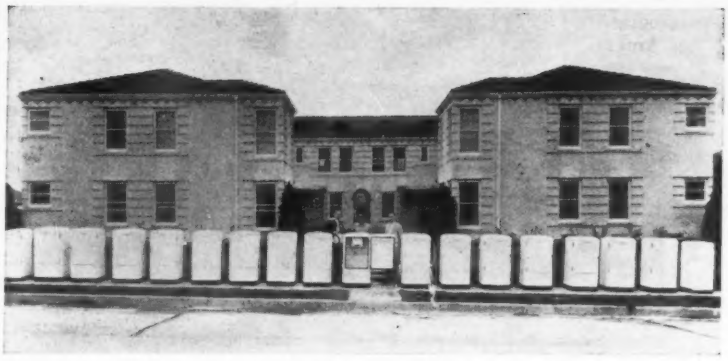
C. O. Hunt, of Purcell, Okla., was well pleased with his electric meter. It operated properly when current was being used, clicking and adding the kilowatts merrily, but when the current was turned off it started running backwards. When the company owed the customer at the end of the month, they exchanged the meter for another.

* * *

Linemen working in relays built a mile and a half of power line in less than two days near Eaton, Colorado. It was all on account of a tiny baby named Paul, weighing only three pounds and three ounces and the doctors who said he would live if they had power for an incubator. The baby was kept alive with hot water bottles and blankets until the linemen came in with the juice. It cost the power company $700.

* * *

Officials of the Arkansas Power & Light Company at Pine Bluff, Ark., are still laughing at this one. A consumer discontinued service



W. E. Titus, of W. E. Titus Wholesale Company, Crosley distributor in Dallas, Oklahoma City and Tulsa, finds the display of refrigerators sold in large groups an effective means of advertising in the district where the installation is made. This picture shows a row of 18 refrigerators which were installed by Titus in a new apartment constructed in Dallas.

and moved to Eunice, Ala., so the company deducted the bill from the deposit and mailed her a check for the balance.

The customer wrote back: "I received your check but on the way to the postoffice and the bank it disappeared. I supose the wind blew it away. Will you please send me another check?"

The note was written on the back of the original check!

Progressive Florida Dealer Occupies New Quarters

One of the most attractive and up-to-the-minute electrical appliance stores on Florida's Lower East Coast is that of the Lang Electric Company at Fort Lauderdale. Opened on April 1, Lang's display facilities demonstrate the merchandising progress being made by electrical dealers throughout the South.

Finding its former quarters on S. W. 2nd Street inadequate to handle present business volume, Lang Electric re-located on Las Olas Boulevard. An attractively decorated, well-lighted display room occupies two-thirds of the new space. The remainder houses the clerical and service departments.

The floor display features G-E's full appliance line, including an all-electric kitchen. RCA radios and Philco-York air-conditioning units also are shown.

Besides Frank Lang, owner, and Mrs. Lang, who is his active assistant, the store has a staff of eight. Two men devote their entire efforts to sales, three divide their time between sales and service while two give their whole attention to the service portion of the business. Mr. Lang is president of the local appliance dealers' association.

New Appliance Firm to Serve Miami Area

Electri-Kel Appliances Inc., 36 West Flager street, Miami, Florida, formally opened for business on March 17. The company is housed in a newly modernized building and will handle a varied line of appliances including Kelvinator refrigerators and ranges, Bendix washing machines and Philco radios.

R. L. Miller, formerly connected with sales departments of the Hoover vacuum cleaner, Easy Washer and Philco Radio, is vice president in charge of sales. He has been in Florida for six years, and more recently was connected with Nash-Kelvinator in Seattle, Wash., and Jacksonville, Florida.

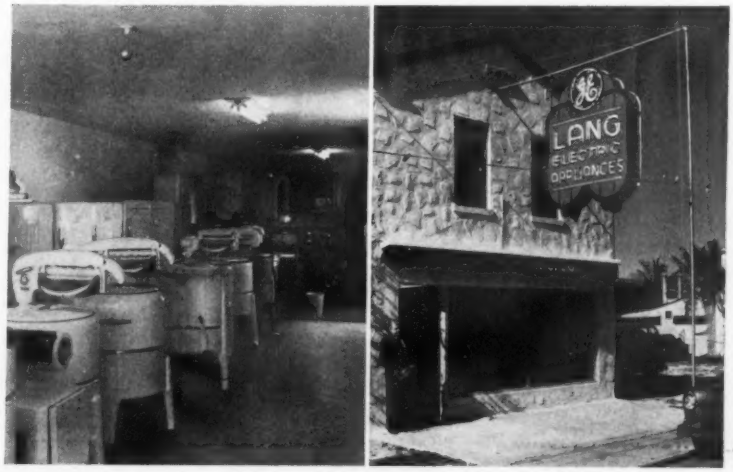
Electrical Code Authority Claimed by Death

Dr. Morton Githens Lloyd, distinguished engineer and chief of the Safety Codes Section at the National Bureau of Standards since 1917, died April 26, 1941, at his home, 100 Taylor Street, Chevy Chase, Md., after a short illness.

Born September 10, 1874, in Beverly, N. J., Dr. Lloyd was educated at the Central Manual Training High School, Philadelphia, and at the University of Pennsylvania, receiving a bachelor of science degree there in 1896, a Ph.D in 1900 and the E.E. degree in 1908. He also had studied at Harvard University and the Friedrich Wilhelms Universitat, Berlin.

During his professional career, Dr. Lloyd made special investigations of the effects of self induction and capacity in alternating-current circuits; thermomagnetic and galvanomagnetic effects in bismuth and tellurium; effects of wave form upon induction meters, core loss and ratio of transformers and hysteresis; effects of phases of harmonics upon quality of sound; measurement of hysteresis and eddy currents; magnetic hysteresis in rotary field; regulation of public utilities; accident prevention; lightning.

Dr. Lloyd had taken a prominent



As a result of increasing business volume, Lang Electric Co., of Fort Lauderdale, Fla., found it necessary to move to new and larger quarters. Attractive decoration, fluorescent lighting, and well-placed display feature the new display room shown partly at left above.

part in many national associations. He was a fellow of the American Institute of Electrical Engineers and a past president of the International Association of Electrical Inspectors.

Bulldog Representative Killed in Accident

Ernest K. Higginbottom, of Atlanta, southern representative for the Bulldog Electric Products Company, Detroit, was instantly killed in an automobile accident which occurred early on the morning of May 17. Mr. Higginbottom

had been associated for many years with the electrical industry in the Southeast and had served as the district representative of the Bulldog Company, in Atlanta, since February, 1938. He is survived by his wife and two daughters, Misses Barbara and Joan Higginbottom.

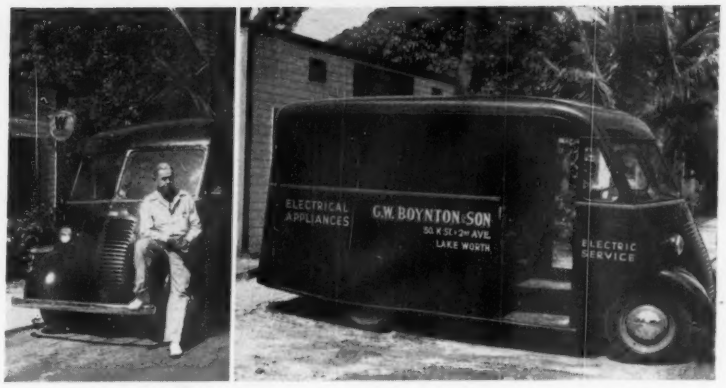
Expansion Program for Fort Worth Distributor

V. A. Hargett, president of the Hargett Electric Company, of Fort Worth, Texas, has announced the completion of a $35,000 improvement program.

The improvement program included mainly the purchase of a new building and installation of much new equipment. The new building, at 1811 North Harwood, has 16,500 square feet of space.

Mr. Hargett is quoted as saying, "We needed more space and have installed a large amount of equipment to handle our electrical department, automotive parts and contractors supplies."

Other officials of the Hargett Company are C. C. Harter, general manager; Curtis Duty, sales manager, and Charles Hogwood, service manager.



G. W. Boynton, of G. W. Boynton & Son, electrical contractors of Lake Worth, Florida, stands beside one of the snappy service trucks that have attracted much attention in Lake Worth. Novel feature in Mr. Boynton's place of business is a photoelectric cell at the front door which rings a chime every time a customer walks in. Result has been good business in door chimes.

New Wholesale Firm Organized in Tampa

Although the Florida Electric Supply is a new wholesaling firm, opened only recently at 317-319 Franklin street, Tampa, Florida, its principals are all well known in the electrical jobbing business. The firm is a partnership composed of J. A. Meier, J. H. Bragg and R. Q. Austin. All were formerly connected with the Raybro Electric Company, also of Tampa, and have been conected with electric jobbing in Florida for the past ten to sixteen years.

Among the lines already stocked are National Electric Products, Hart & Hegeman, Cutler-Hammer, Burndy Engineering Co., Chase-Shawmut, Edwards, Goodrich, Killark, and Wiremold.

Sales activities will be concentrated in Tampa and vicinity, and contacts will be maintained with all electrical contractors and industrials with electric departments. Mr. Austin will be in charge of the office and Mr. Meier and Mr. Bragg will work the territory.

An innovation in filling orders is the use of a 4-wheeled cart to pick up the merchandise, similar to those used in grocery stores of

Line-up of the forces of Freck Radio Company, Sylvania radio tube distributors, that have a hand in accounting for the brisk radio tube and parts business being done by this organization in the reaches of the Great Smokies, Asheville, North Carolina. Reading from left to right: K. B. Stubbs, G. B. White, Jr., M. V. Carson, William W. Orr, Frank Jackson, Kyle Morgan, T. T. Freck, owner-manager, and J. E. Jayner, Jr.

Veterans in the electrical jobbing business are the three partners in Tampa's recently organized Florida Electric Supply. Left to right are J. A. Meier, R. Q. Austin, and J. H. Bragg. Above, at left, exterior view of the new company's headquarters, and at right a portion of the city order counter.

the wait-on-yourself and super market type. After several weeks use of this device they have found it speeds up collecting the items in an order.

Arkansas Distributor Extends Appliance Line

O'Bannon Brothers, Little Rock, Arkansas, have been appointed distributors for General Electric cleaners, clocks, fans, heating devices, and sunlamps, and will continue to handle G-E refrigerators, ranges, water heaters, diswashers, disposalls, dishwashers, and kitchen and laundry equipment.

New Crosley Distributor Appointed in Richmond

Appointment of the firm of Louis O. Bowman, Inc., of 301-303 North First Street, Richmond, as distributors of Crosley products, including Crosley refrigerators with the Super Shelvador, Crosley radios, Crosley gas and electric ranges, and Crosley Savamaid washers and ironers, has just been announced by Robert I. Petrie, vice-president and general sales manager of the Crosley Corporation.

Honor Roll of Southern Section

The following members of the Southern Section, International Association of Electrical Inspectors, have enrolled one or more new members for the association since the current membership campaign was initiated at the close of the annual meeting, September 14. Numbers at right indicate number of new members enrolled.

Name:	No. Enrolled:
Bagwell, H. O.—Carrollton, Ga.	1
Bommer, A. J.—Dallas, Texas	10
Camus, Frank—Shreveport, La.	8
Campbell, R. D.—Asheville, N. C.	1
Coleman, E. C.—Monroe, La.	1
Dougherty, C. H.—Franklin, Va.	1
Eaton, W. M.—Norfolk, Va.	2
Eberling, J. H.—Houston, Texas	2
Edwards, Virge—Lyon, Mass.	16
Fisher, J. G.—Jackson, Miss.	5
Fletcher, G. R.—Alexandria, Va.	2
Goodson, Fred—Houston, Texas	3
Hancock, A. E.—Austin, Texas	4
Hendricks, R. B.—San Antonio	8
Jones, C. T.—Atlanta, Ga.	1
Keeley, K. K.—Shreveport, La.	2
Kenderdnie, E. L.—Ft. Worth, Texas	1
Kersey, T. M.—Dallas, Texas	2
King, A. T.—Marietta, Ga.	1
Knox, E. C.—Miami, Fla.	2
LaTour, John—Daytona Beach, Fla.	1
Lyncker, F. O.—New Orleans, La.	1
McKinney, E. W.—New Orleans, La.	2
Mathieu, L. D.—Corpus Christi, Texas	1
Miller, G. M.—Richmond, Va.	1
Muller, Paul—New Orleans, La.	2
Murphy, J. M.—Roanoke, Va.	1
Muths, S. L.—Gulfport, Miss.	1
Peters, K. O.—St. Petersburg, Fla.	2
Sagendorf, F. P.—Fairfax, Va.	1
Segall, B. Z.—New Orleans, La.	9
Speights, J. L.—Richmond, Va.	2
Sprouse, J. B.—Clarksdale, Miss.	7
Stewart, W. B.—San Ontonio, Texas	1
Turnage, L. A.—Hartsville, S. C.	1
Verrett, J. A.—Port Arthur, Texas	2
Weber, Chas.—Beaumont, Texas	1
Welman, George—New Orleans	4
Whitner, Jos.—Atlanta, Ga.	3
Yancey, W. H.—Charlotte, N. C.	1
Yelgerton, T.—Sylvarena, N. C.	1
Zimmer, Chas.—Houston, Texas	4
Applications Not Endorsed	5
Total	127

Electric Supply Company Assumes Victor Fan Line

The Electric Supply Company, 179 Luckie Street, Atlanta, announces that they have recently been appointed exclusive electrical distributors for Georgia to handle the new line of fans and blowers manufactured by Victor Electric Products, Inc., Cincinnati, Ohio. The Electric Supply Company will maintain complete stocks of these new items in Atlanta, as well as their branch house at Albany, Ga.

Roos Named Vice President of Electrical Supply Co.

James N. Roos was appointed vice-president of the Electrical Supply Company of New Orleans recently. Mr. Roos was first employed by the company as a stock boy 21 years ago. Since that time he served as receiving clerk, city salesman, assistant city sales manager, city sales manager, radio manager, assistant general sales manager and general sales manager.

Philco Distributors Meet In Memphis and Atlanta

Details of the program for the five sectional distributor spring meetings to be held by Philco were announced recently by Thomas A. Kennally, general sales manager.

Larry E. Gubb, executive vice president, and Sayre M. Ramsdell, director of public relations, will open the meeting, with Kennally presiding.

Larry Hardy, manager of compact sales, will present the new line of portable radios, including refinements on current models as well as introduction of new units. Details of the big new triple-refrigeration promotion will be discussed by James A. Carmine, assistant sales manager.

MANUFACTURERS' News

Kelvinator 1941 Sales Set New Records

January-February-March business of the Kelvinator Division of Nash-Kelvinator Corporation has smashed all existing company records, with sales of Kelvinator electric refrigerators during these first three months of the 1941 model year already amounting to one-half of the total volume achieved by the company in 1940 and exceeding by a comfortable margin the entire year's sales during 1939, it was announced today by Frank R. Pierce, general sales manager.

Stating that this year is expected to be the biggest in Kelvinator's history, Mr. Pierce said that business so far during the 1941 fiscal year is running more than double that of the correspoinding period in 1940 and four times that of the same period in 1939.

The tremendous increase in Kelvinator volume is highly significant, according to Mr. Pierce, who says that these exceptional gains were made while the industry as a whole was increasing its sales only 39 per cent. We pointed out that Kelvinator's doubling of volume follows the precedent-shattering increases made by the company last year, when it broke all records for sales gains in the electric refrigeration industry by doing 2¼ times its 1939 business.

He reported that the vast strides made by Kelvinator were directly attributable to the manufacturing, distribution and selling program which was inaugurated by the company in January, 1940, and which is now in its second phase. This program not only enabled retailers to sell new high-quality electric refrigerators to the public at greatly reduced prices, he said, but it embodied a new selective dealer plan that provided for broadened retailer markets and made it possible for dealers to obtain a real volume at full retail price. The program also gave dealers sounder, more logical step-up selling methods, he said.

Trumbull Electric Acquires Two New Factories

The Trumbull Electric Mfg. Company, of Plainville, Conn., announces that on March 10th it transferred its equipment from the Ludlow, Ky., plant to a much larger factory in Norwood, Ohio, (which is a part of metropolitan Cincinnati). This new factory contains triple the floor space of the old plant.

The company also has purchased an additional factory in Plainville, Conn., known as the West Plant. The acquisition of these added factories will materially increase this company's production facilities.

Aurora Equipment Company Marks 30th Anniversary

May, 1941, is the 30th anniversary of the founding of the Aurora Equipment Company, Aurora, Illinois, manufacturers of all types of steel fixtures and equipment for storage and display.

Thomas M. Dunham, who is president and general manager of the company, began the business in New York City thirty years ago and two years later removed his establishment to Aurora. In 1913, the company was incorporated.

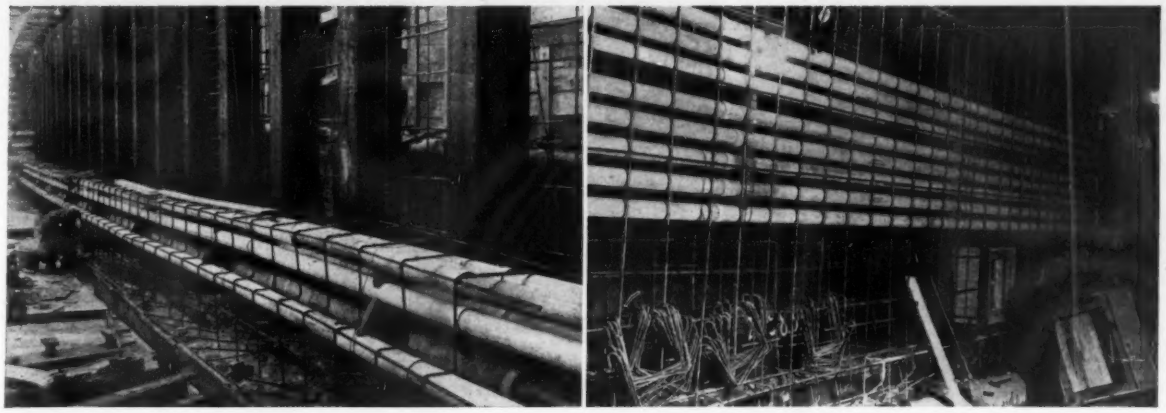
Showing a continued and uninterrupted growth, the Aurora Equipment Company recorded one of its best years in 1940 and so far this year is operating at a substantially greater volume than in the same period last year. February, 1941, was one of the largest months in the company's history and March likewise made an enviable record.

Commemorating its 30 years of business in the steel equipment industry, the Aurora Equipment Company just now is issuing one of its most complete and comprehensive catalogs. This catalog is for general commercial and industrial use and includes the company's entire line apart from display fixtures which are illustrated and described in separate literature.

Complete New Cleaner Line Offered by Universal

Landers, Frary & Clark in presenting a complete new line of vacuum cleaners including conventional type floor models, hand models, and cylinder type cleaners in a complete range of prices from $19.95 to $59.95, truly capable of living up to Universal's slogan, "A Model for Every Purse and Purpose."

The Single-Set switch on the Westinghouse range interested these representatives of the Westinghouse Electric Supply Company when they gathered recently at Mansfield, Ohio, for a meeting of Westinghouse sales promotion managers. In front, left to right, are W. N. Kennon, Atlanta; D. E. Lenfestey, Boston; and C. H. Weaver, Pittsburgh; behind them is C. D. Allison, Dallas. At the right is A. W. Sullivan, New York, general sales promotion manager for the Westinghouse Electric Supply Co. At right, Harold B. Donley of New York, left front, recently appointed merchandise sales manager for the Westinghouse Electric Supply Co., discusses the deep-well cooker on the Westinghouse range. Others, left to right, are J. H. Tuttle, Dallas, Southwestern District sales development manager for WEMCO; R. Leon, Cleveland, and L. L. Dolin, Philadelphia, WESCO sales promotion managers; and J. V. Russell, Atlanta, Southeastern District sales development manager for WEMCO.



Johns-Manville Transite ducts have an important role in the electrical installation of the Bankhead Vehicular Tunnel recently completed near Mobile, Alabama. These views show parts of the duct lines during installation. Although not the largest, this is one of the outstanding installations of Transite ducts in the South. Incombustibility of Transite was an important consideration in this tunnel job. This is important in all subway work, due more to the panic hazard of smoke and fumes in the event of a cable failure rather than the real danger from fire. Another important advantage claimed for this type of duct is its freedom from swelling or deterioration due to moisture.

In discussing plans for promoting the new Universal tank type cleaners, Lee Moss, manager of the Vacuum Cleaner Division of the Company, says: "The tank cleaner of the famous "Tattle-Tale" light has been our most popular cleaner with our Economy Model close on its heels as representative of a cleaner offered to customers who are interested in fine quality at a low price.

"In developing a new motor driven brush floor model cleaner at $19.95, we believe, we have produced the cleaner sensation of the year. It is a quality cleaner with ball-bearing motor, nickel plated hardware, single nozzle adjustment, and tilting device on side of handle bail. It is especially designed for the family with a low income. The fact that 50% of the wired homes in the county today—even after 25 years of intensive cleaner selling—have no vacuum cleaner because the owners haven't been able to buy one at prevailing prices evidences need for this sensational economy leader."

Frigidaire 25-Year Men Honored at Dinner

Twenty-five Frigidaire employees each with an unbroken service record for a quarter of a century, were honored by a testimonial dinner given by Frigidaire executives and department heads. Each of these men have been continually employed since 1916 when Delco-Light, the parent company of Frigidaire Corporation and later the Frigidaire Division of General Motors Corporation, was formed.

Special significance was lent to the occasion by the fact that it coincided with the 25th Anniversary of the association of E. G. Biechler, Frigidaire's general manager, with the organization. R. H. Grant, sales manager of Delco-Light in 1916, and now vice-president of General Motors Corporation, was a special guest.

The 25-year veterans honored were representatives from all phases of the organization—production, engineering, sales, and management. The oldest, in point of years, was Geo. H. Yehle, who is 80. The youngest, Geo. M. Troup, is 41 years old, and began with Delco-Light at the age of 16. Of particular interest was the fact that the group honored represented approximately one sixth of the total number of employees on the Delco-Light payroll in 1916. Today Frigidaire employees total 15,000 at the Dayton, Ohio plant.

A pleasant evening was spent reminiscing and recalling "the good old days." Mr. Biechler was presented with a scroll with the signatures of all present, commemorating his 25th Anniversary. All of the 25-year men were presented sterling silver cigarette boxes by their associates.

Twenty-five Frigidaire employees each with an unbroken service record for a quarter of a century were honored by a testimonial dinner given by Frigidaire executives and department heads. Left to right, seated, C. A. Copp, vice-president; G. H. Yehle, advertising display department; P. M. Bratten, general sales manager, appliance division; E. G. Biechler, general manager; R. H. Grant, vice-president, General Motors Corporation; L. C. Shannon, manager, foreign department; and R. V. Polen, assistant manager of plants.

Frank Adam Electric Co. Celebrates 50th Year

The Frank Adam Electric Company, of St. Louis, this year completes a half-century of service. Its activities in the development of its present line of products began in 1891—fifty years ago. Its present advanced position in the industry is due to its pioneering development of these products—which are today widely used—not only in the United States, but in many foreign countries.

The start of the business goes back to 1846, when Jacob Blattner came from Switzerland to St. Louis, and opened a shop and store for the manufacture and sale of optical and mathematical instruments. In the early seventies he turned this business over to his son, Henry, and his son-in-law, Frank Adam, who operated as Blattner & Adam, at 220 North Fourth Street.

The firm not only sold optical goods but also manufactured mathematical instruments, such as surveyors' chains, plumb bobs, compasses, levels and transits. Fred B. Adam, son of Frank Adam, and the present president of the company, started work in the shop when 16 years old, and his first job was forming

links for surveyors' chains. Later, he made plumb bobs and compasses, using a foot-powered lathe and hand tools.

The business was expanded to include the installation and repair of signal fire alarm systems for the Western Electric Company, which, in 1876, turned over this part of its business to Blattner & Adam. From then on, the latter made electrical installations of all kinds—from small call bell systems to large annunciator systems for hotels—probably the largest of which was installed in the famous old Planter' House, in St. Louis.

About this time, S. B. Pike, manager of the Metropolitan Electric Light & Power Company persuaded Blattner & Adam to extend their activities to include electric light wiring.

For the very first wiring installation made by Blattner & Adam, they originated the idea of making a complete wiring plan showing the capacity and location of the service entrance switch, the main feeder and the branch circuit panelboards; also the capacity and location of each branch circuit with its switches and outlets.

By 1891 the electrical department of the company under the supervision of Frank Adam, had grown to such proportions that the partners decided to separate—Frank Adam taking that part of the business, which he established at 907 Market Street, and operated as the Frank Adam Electric Company, while Blattner continued in the optical business.

Frank Adam could not, however, incorporate as the Frank Adam Electric Company, for he was estopped by the Adams Electric Company, owners of Dr. Wellinton Adams' patent on electric street railway systems. These patents however, were not sustained by the court, and the Adams Electric Company went out of business. In 1898 Frank Adam succeeded in incorporating as the Frank Adam Electric Company, the name the company bears today.

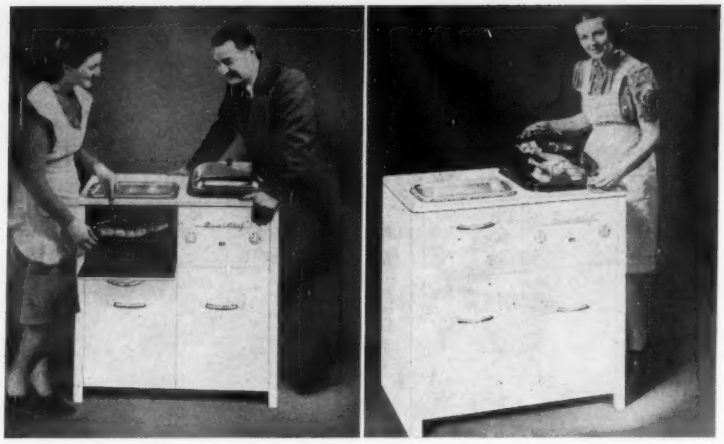
Early in 1901, the Company took over the switchboard department of the Emerson Electric Manufacturing Company. At this time it was also engaged in the manufacture of push buttons, burglar alarm connections, snap and knife switches, panelboards and small switchboards. The Company was the first to make the flush type of snap switches for the home.

Up to this time the business was almost all local, but with the addition of the switchboard department, sales began to be made outside St. Louis, and the sales territory gradually expanded. This was really the beginning of the Company's national business.

The erection of the beautiful building with their wonderful electric lighting effects for the St. Louis World's Fair, held in 1904, sent the sales of the Company to new high levels. An enormous amount of switchboard work was awarded to the Company, adding greatly to its activities.

During the next fifteen years a

(*Continued on page 46*)



Shown above are two cooking operations on the new Nesco Chef, a new low cost complete cooking appliance. Designed to sell for less than $65, this versatile new appliance may be used for cooking complete meals, broiling, roasting, frying, baking, warming and canning.

New Cooking Appliance Introduced by Nesco

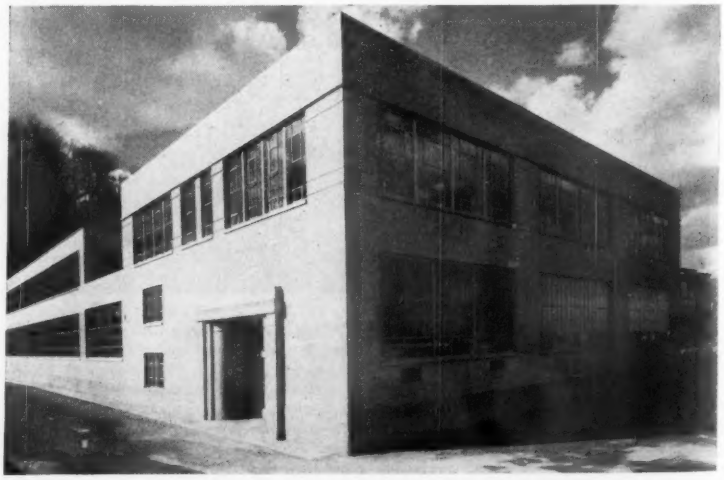
A newcomer to the domestic electric appliance field is the Nesco Chef recently introduced by National Enameling and Stamping Co., of Milwaukee, Wis. This new low cost, complete cooking appliance operates on 110-115 volts. It combines the best features of an electric roaster, a broiler, and a surface unit.

The new appliance is versatile since it may be used for cooking complete meals, broiling, roasting, frying, baking, warming, canning and storing idle utensils. What is most advantageous is the fact that the average householder can use the Nesco Chef on her regular service outlets without the necessity of expensive power line installations. It offers all of the advantages of clean, safe, electric cooking without the attendant expense.

Designed to sell for less than $65, the Nesco Chef has a large 18-quart roaster oven with easy-to-clean porcelain enameled well and three inset pans. This glass wool insulated roaster oven is regulated by an accurate thermostat with signal light control and may be turned on and off automatically by a special time clock available as accessory equipment. The surface and broiler unit with 600-watt, 1200-watt, and 1600-watt combinations adequately fills the need for quick, efficient surface cooking and broiling. Extra large, enclosed storage space provides much needed space for idle utensils and table appliances.

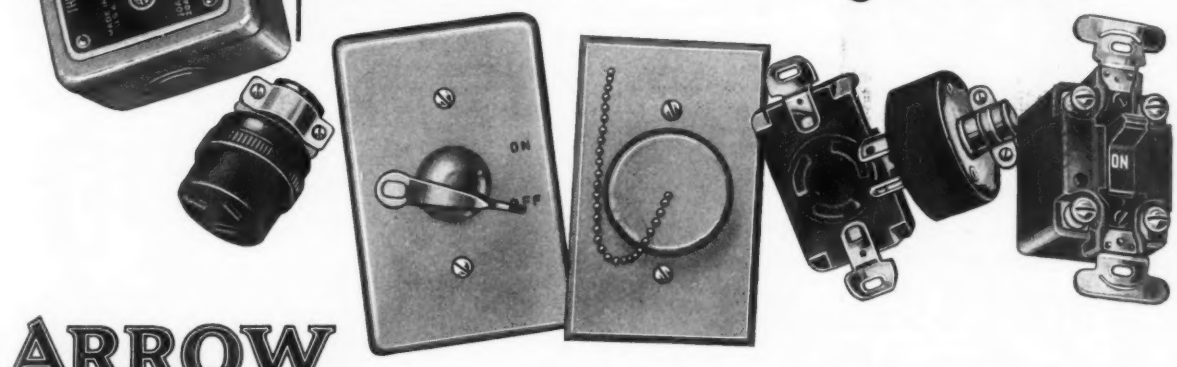
G-E Opens New Building In Charleston, W. Va.

Playing host to more than 400 guests during an all-day open-house celebration, General Electric recently opened its new building in Charleston, West Virginia. Centered in the new building, in the interest of better service, are facilities for G-E's sales, engineering, and servicing operations in an area comprising a 150-mile radius of Charleston.



Cut in on Defense-plant Wiring

with the "front line" of Industrial Wiring Devices



ARROW

Industrial Electrical Equipment includes (beginning with top figure above): 3-wire Receptacle with rubber Plug; 2-wire, 20 amp. Duplex Receptacle with cord-grip Cap; Type C Ceiling Pull Switch; Small Motor Starting Switch; 3-wire rubber Cord Connector; Outdoor Weatherproof Switch; Weatherproof Receptacle; 3-wire Flush Receptacle with Cap; Type C Tumbler Switch. Complete-line Catalog lists many more "*current* necessities" for industrial jobs.

NEW plant facilities have one objective: — to give more power to PRODUCTION. And that's the object of the wiring systems! New wiring and re-wiring jobs are planned to facilitate *production* through more electrical outlets and controls; more numerous and convenient power-connections.

ARROW is supplying a record production of Wiring Devices for heavy-duty service, of a quality assisting in smooth operation of hard-driven defense industries and others. Numbers illustrated above — listed at left — are typical demand-leaders of today. Designed to help our Contractor-customers to take a leading hand in their *LARGEST JOB!*

ARROW ELECTRIC DIVISION
THE ARROW-HART & HEGEMAN ELECTRIC CO. HARTFORD, CONN.

The new structure is two stories in height, of modern brick and steel construction. Offices are air conditioned and equipped with the latest fluorescent lighting units.

Of the building's 20,000 square feet of floor space, 9,000 are allocated to service shop operations, 6,500 to warehouse facilities, and 4,500 to office operations. The service shop and warehouse are located on the first floor; the local office occupies the second.

Location of the service shop in Charleston marks an expansion of General Electric's servicing facilities in this area. The shop itself includes a crane bay, two stories in height, and is completely equipped to give electrical service 24 hours a day.

New Products

1941 Westinghouse Roasters

New styling and color are featured in the three new roasters now being introduced by the Westinghouse Electric and Manufacturing Company, Merchandising Division. The 18-quart deluxe Roaster-Oven has automatic heat control with a newly-styled control switch, signal light, and nameplate. Other features are the exclusive Look-In lid, which enable the user to see the food cook without lifting the lid, and the Time-Temp shelf, which slides from the base of the roaster. This shelf lists all essential cooking times and temperatures, and has a utility value in that it may be used as a shelf for hot dishes.

The nameplate and the Hall China dishes, which may be used for cooking and serving, are of Betsy Ross blue, and the new inset pan, with a wide overlapping rim which makes the roaster easy to keep clean, is in gray.

The 16- and 18-quart regular Roaster Ovens have True-Temp heat control and Fiberglas insulation, and are equipped with heat-proof glass dishes.

An electric timer, which fits into the roaster cabinet and turns the current on or off is introduced with the 1941 line.

A complete program of dealer helps has been provided in connection with the anouncement of the new roaster line. This will include a display piece supplied free with the initial order.

Norge's New Range Line

The new Norge electric range line, which comprises 8 models, is adapted to every budget and every need. Careful attention has been paid to every detail—sweeping lines of the one-piece top with graceful, sloping backrail are unbroken by crumb-gathering, grease-collecting seams. The heavy-gauge metal exterior; finished in brilliant white porcelain enamel, is as sturdy as it is handsome. The base, recessed for foot-room, is finished in ebony enamel with chrome trim, and controls are white plastic with chromium inlay.

Outstanding among an imposing list of advanced features are: accurate Norge six-speed switches; circuit-selector switch and clock for automatic timing; a choice of two types of high-efficiency, high-economy top cooking units — either Chromalox or T-K; large-capacity oven with speckled light gray enamel lining; dual oven elements for ballanced heat; high-speed broiler unit with reflector plate; Mineral Wool oven insulation and extra-thick door for economy and conservation of heat.

The Norge six-speed switch is particularly worthy of note. This feature affords accurate six-stage heat control and provides more than adequate heat gradations for every cooking operation from simmering to speed-cooking. The Norge six-speed switch was developed in accordance with the principle that accurately measured heat is not only requisite to successful cooking results but represents a measure of economy as well.

Water Heater Demonstrator

The General Electric water heater sales section is making available to salesmen this inexpensive miniature water heater model, small enough to be carried in a pocket. The front of the model is hinged, and swings back to reveal the inner shell or tank, heating units, controls, and other features.

On the inside of the door ten features are listed, selected by G-E because they stand for low cost and long life operation: rock wool insulation, rigid conduit, the adjustable thermosnap, sealed Calrod heating units, outlet box, heat trap, durable tank, cold water inlet, cold water baffle, and the free flushing drain valve. Each is a commandment to a salesman to tell his story, and each can be seen in miniature just opposite. Since it probably marks the first time that the prospect has seen the inside of a water heater, the model is fascinating, and provides the salesman with an interest-compelling retail sales tool.

Premier Vacuum Cleaner

Top of the new Premier line for 1941 is the De Luxe Model 11 Floor Cleaner. Outstanding new feature of this model is its Matho-Matic Nozzle which automatically adjusts itself with mathematical precision to any floor surface, thus assuring most efficient cleaning. The movement of the cleaner handle from vertical to normal cleaning position brings the automatic adjustment into operation. It works with exact accuracy—whether

21,000,000 VOLTS of R & M FAN ADVERTISING

$10.95
RETAIL
10-INCH OSCILLATING
As advertised in The Saturday Evening Post

On goes the power to help you sell R & M fans—one of the biggest national magazine advertising campaigns launched by a fan manufacturer in recent years. Five half pages in The Saturday Evening Post; five two-thirds pages *each* in Time and Business Week—fifteen high-voltage ads in all, with a total of 21,000,000 impressions! All working for you now—from May 22 and on through ten consecutive weeks—when the weather is hot and sales are hotter.

Direct the force of this all-out advertising drive to your cash register with displays, newspaper ads, consumer folders and other sales-maker helps furnished free to you by R & M.

R & M is the "live-wire" line for '41. Order your stock of R & M fans for homes, offices, stores, factories from your jobber now—and get ready for the most profitable fan season you have ever known. If you do not know the name of your nearest R & M fan distributor, wire or phone the nearest R & M branch office.

(Prices and specifications subject to change without notice)

HERE'S the spark plug of the R & M fan line—the new R & M Banner—a streamlined, 10-inch, oscillating beauty, retailing at only $10.95—a real R & M quality fan! And imagine how you can meet price competition with the new 8-inch, non-oscillating Banner at only $3.95, or the graceful, sturdy 12-inch, two-speed Banner oscillator at $17.95. Stock plenty of these new R & M Banner fans now and get set for a "banner" season.

BRANCH OFFICES IN

CHICAGO 2400 W. Madison St.	KANSAS CITY 2105 Grand Ave.	NEW ORLEANS 500 Camp St.
NEW YORK 200 Varick St.	PHILADELPHIA 401 N. Broad St.	SAN FRANCISCO 237 Rialto Bldg.
DALLAS 1100 Cadiz St.	BRANTFORD, ONT. Robbins & Myers Co. of Canada, Ltd.	

ROBBINS & MYERS • Inc.
FAN DIVISION • SPRINGFIELD, OHIO

on thick rugs, thin rugs, bare floors, linoleum or any type of floor covering. The Model 11 is smartly styled in black crinkle finish with polished aluminum trim and harmonizing dust bag. Other features include: two-speed, 350 watt, ball-bearing motor; ball-bearing, motor-driven, double brush; foot-controlled handle release; dirt-finding Search-Lite; radio interference eliminator; accordion-top bag with dirt trap, trigger type, two-speed switch and no-strain hand grip.

Hotpoint Visualizer

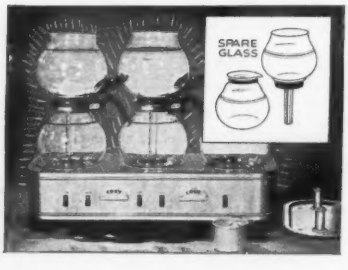
Spin the dial on this 1941 Hotpoint Refrigerator Door Visualizer, and the advantages of the storage zone shown by the big pointer will be automatically dramatized in the open space above the circle. For example, in the photo, the pointer indicates "Extra Storage Bin," while the top picture shows the over-crowded

kitchen shelf—a pet peeve of every homemaker. By means of a special adhesive, this remarkable sales aid can be mounted on the door by simply pressing it in place.

This splendid sales builder has been made available to Hotpoint retailers through their wholesale distributors by the Hotpoint Refrigeration Division at surprisingly low cost.

Cory Coffee Brewers

Effective with the issuance of the latest Cory Catalog, March 15th, every commercial model of Cory Coffee Brewers of two burner size or larger, is being equipped with spare upper and lower glass. This is of especial advantage to those who buy the popular two burner gas or electric models.



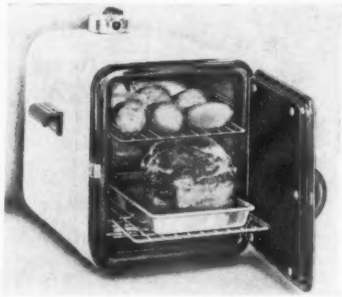
The electric three burner equipment pictured, is the new de luxe model No. 713. Black legs and black glazed bricks make pleasing contrast with the polished chrome finish. Two of the burners are 2-heat and the right burner low heat only, for keeping the brewed coffee at ideal serving temperature. With Majestic glassware as shown, capacity is 125 cups of coffee an hour.

There are over 70 Cory models for the brewing of coffee in any desired quantities, and using electricity, gas or other fuel. The new Cory Catalog presents the full line and may be secured by addressing Glass Coffee Brewer Corp., Chicago, Ill.

Universal Electric Oven

The new Universal Automatic Electric Oven broils, roasts, bakes and cooks everything within its capacity as efficiently and perfectly as a standard electric oven. It can be operated from any baseboard outlet, provides at a small cost, all the comforts, cleanliness and certainty of results of modern electric cookery.

This oven, number E9910, requires no special wiring, comes with roasting pan and broiler rack, and is finished in white baked enamel trimmed with black. It has stainless steel bands and is porcelain-enameled inside. It is heavily insulated for inside heat retention and conveniently priced at $19.95.



It is now being shown together with the number 29621 1000-watt Universal Hot Plate having 3-heat switch, porcelain enamel finish. This combination is featured as ideal equipment for the summer home or cottage, the small apartment, or the regular home kitchen.

Lloyd Lamp Starters

The Lloyd Fluorescent Lamp Starter has more than met the requirements as to length of life, starting speed and general efficiency set up as standard by Electrical Testing Laboratories of New York, reports the Lloyd Products Co., Providence, R. I. The company states that the active life of Lloyd starter FS-2 for 15-watt and 20-watt lamps, and FS-4 for 30-watt and 40-watt lamps has been shown in other tests to be practically double the minimum requirements, demonstrating unusual efficiency under all service conditions.

In the new Lloyd socket the unique dual spring action provides positive contact on both starting terminals. The double "lobster claw" lock ensures perfect electrical contact at all times and prevents loosening of starter through vibration or shock. Together, the Lloyd Starter and and Lloyd Starter Socket provide a fluorescent unit assuring quick starting, longer lamp life and increased economy. Growing demands for Lloyd products has led to the establishment of representation in twenty-two of the larger cities throughout the country.

All-Rubber Outlet Plug

An unbreakable all-rubber multiple-outlet plug (cube tap)—the first in electrical history—has just been placed on the market by United States Rubber Company. Approved by Underwriters Laboratories after insertion tests 20 times as rigid as those ordinarily used, the plug is claimed to have unusual safety qualities.

It is capable of withstanding ex-

tremely heavy pressure, and its patented construction makes it impossible for any metal parts to become exposed under any conditions. The spring friction blades provide permanently tight connections, another safety feature.

In design the plug is much smaller than the older types, making it compact and neat appearing in the home. Being made of rubber, it is scratchproof and sound-proof.

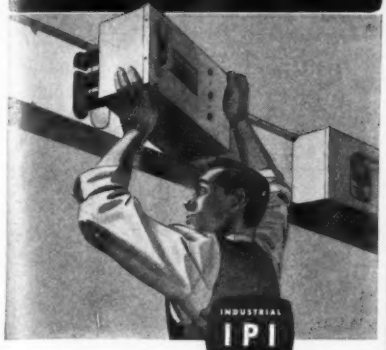
The plug is molded of fine quality rubber in a single unit. The metal parts are then inserted and anchored by a patented process which permanently locks them into place. Each plug is finally tested before being released for sale.

New Flexibility for "CordX"

A new and unique construction for "CordX," the G-E 60 per cent type S all-rubber cord, has been developed which makes the cord extraordinarily flexible and durable, it has been announced by the General Electric construction materials division, at Bridgeport, Conn. This cord is designed for use where service conditions are severe. Field tests have shown that it gives unusual performance.

Flexing life of the new "CordX" is doubled and stripping is made easier by this new construction which employs a bias cotton wrap placed directly over the cord and vulcanized into the inner surface of the rubber

The latest development in Industrial Power distribution



I.F.B.—Industrial Feeder Bus and I.P.I.—Industrial "Plug-in" Bus embody the latest improvement in the enclosed busbar system of electrical power distribution. Write for literature.

NATIONAL INDUSTRIAL IFB FEEDER BUS

National Electric
PRODUCTS CORPORATION
Pittsburgh, Pa.

A New Wirewa

NATIONAL FOUR BY FOUR WIREWA

4 x 4 Wirewa may be mounted direct to the wall. No projecting brackets necessary. Quick and easy to install couplings. Only two bolts to tighten. Quick access to the full length of wireway. Investigate—Write for literature.

National Electric
PRODUCTS CORPORATION
Pittsburgh, Pa.

NEW Products

"Plug-in" Strip

The new "Plug-in" Strip method of Circuit Wiring, developed by National Electric Products Corporation, Pittsburgh, Pennsylvania, provides adequate outlets every 6, 18 or 36 inches all around the entire room—literally "Outlets by the Yard."

The strip is easily installed directly on top of the baseboard or beneath the baseboard trim. "Plug-in" Strip comes in 6″, 1′, 18″, 2′, 3′, 6′ and 9′ lengths. It is finished in black and it can be quickly painted to match any color.

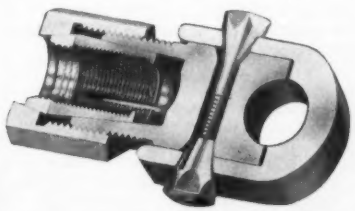
Write to National Electric Products Corporation at Pittsburgh for the booklet they have just issued on this material—adv.

Mechanical Connectors

The National Electric Products Corporation of Pittsburgh, Pennsylvania, has used the orthodox method of the wedge principle in the construction of their Gorilla Grip Connector line.

The connectors embody two types of this wedging principle—the sleeve, lock-ring and nut and the tapered bolt and nut.

The cross-section shown reveals how the wedge principle is applied.



The connectors may be purchased in handy stock or emergency sets which makes it possible to carry 125 various combinations of connectors directly to the job without back-tracking to the stock room and losing valuable time on a breakdown.

Write to the company for literature—adv.

√ Check

National Products melt into the job without those losses usually incident to promiscuous buying.

SHERARDUCT
ECONOMY
XDUCT
SHERARDUCT JR.
XDUCT JR.
NEPCODUCT
A. B. C. CABLE
FLEXSTEEL CONDUIT
OVALFLEX
I. F. B.
I. P. I.
4 x 4 WIREWA
METAL MOLDING
XTENSIONDUCT
FLORDUCT
"PLUG-IN" STRIP
"CANVAS-BACK" LOOMWIRE
FITTINGS
WEDGE BOXES AND COVERS
GORILLA GRIP CONNECTORS
"DILEC" WIRES AND CABLES
INDESTRUCTO
BRACKETS AND WIREHOLDERS
OVALDUCT

HOW TO BEND 1¼-4½ in. PIPE 3 TIMES FASTER

If you bend conduit and pipe with obsolete bending equipment or clumsy makeshift methods, Greenlee Hydraulic Benders can save you as much as 75% in bending time. Greenlee Benders, with their powerful hydraulic units, bend 3 times faster because they're easier for the man on the job to operate. The No. 770 Bender, shown above, has a maximum pressure of 25 tons for bending 1¼ to 3-inch conduit, while the larger No. 775 Bender with a maximum pressure of 40 tons will handle 3 to 4½-inch material. There's also a complete selection of Greenlee hand benders for tubing up to ¾-inch. Write for new S-116 Bender Booklet . . . it'll show you how to save time and money on every bending job.

★ HERE'S WHY YOU SAVE TIME WITH GREENLEE BENDERS

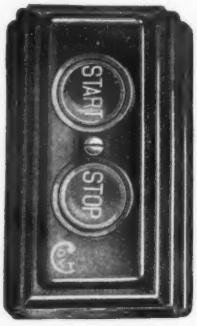
- ✓ One man can easily and quickly develop the pressure needed to bend conduit up to 4½ inches.
- ✓ You save cost and time of installing many manufactured bends and fittings.
- ✓ You eliminate expense and delay of cutting and threading nipples.
- ✓ The smooth, even bends made by Greenlee, eliminate wasted time when pulling in wire.
- ✓ The Greenlee, built in one unit, is easily carried to the job and set up and is easier for operator to handle.

GREENLEE TOOL CO.
1707 Columbia Ave., Rockford, Illinois

jacket. This wrap supplies an anti-friction surface between the jacket and the rubber-insulated conductors. All other materials used in the manufacture of the cord contribute to its flexibility and durability. The conductors are made of many fine strands of fine soft annealed copper. A cotton separator is applied directly over the copper to prevent corrosion and to relieve strain on the wires. The individual conductors are insulated with performance-grade rubber compound. Cotton fillers are used to cushion the rubber insulated conductors and protect them from damage by impact.

Colt Control Stations

One of the devices developed in connection with the new line of Colt industrial controls is the No. 202 Colt Push Button Station. It is attractively styled for use with modern streamlined machines, designed for surface mounting. Cover is of a heavy molded phenolic with a guard ring raised the full height of the start button to prevent accidental operation. Usual mounting is vertical but if horizontal mounting is desired, the buttons can be turned to read correctly in that position.



The internal mechanism is self-contained on a rugged molded block which is mounted directly on the metal base by two screws. Base has two conveniently located mounting holes in opposite corners and has ½" and ¾" pipe knockouts on both ends. Standard finish is black top on machine gray bottom, but special color combinations can be supplied.

For more complete information on this new Colt Push Button Station, write the Electrical Division of Colt's Patent Fire Arms Mfg. Company, Hartford, Conn.

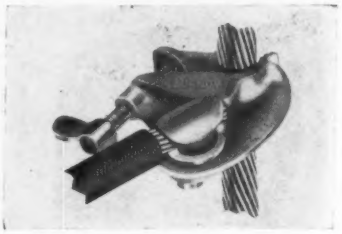
Variable Speed Pulley

The Ideal Commutator Dresser Co. Sycamore, Ill., announces a new variable speed pulley desigend for light, inexpensive machinery. The pulley mounts directly on the motor shaft and requires only standard V-belts.

Features include short over-hang, forced lubrication, balanced sheave and all metal construction. Both halves of sheave move giving accurate belt alignment at all times. The pulley faces are curved so that the belt has full contact at all pitch diameters. Speed ratios up to 2¾ to 1 available. Sizes up to ¾ hp.

Burndy Hottap

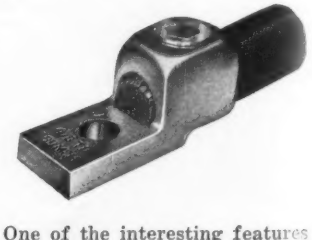
Burndy Engineering Co., New York City, announces a newly designed Burndy Hottap especially suitable for taking taps from either cable or flat bar. In addition to being useful for utilities, this connector has a broad field of application in industrial plants. It may be used for grounding, temporary taps and jumping equipment being repaired or replaced.



The jaws which grip the "hot" conductor have grooved contacts which are designed to clamp cable, and serrated contacts which may be used to securely clamp flat bar. On the tap, rotatable eye clamping element is used. This permits the tap conductor to be connected to the Hottap at any angle. This connector can be supplied for any desired sizes of cable or flat bar.

New Trumbull Handi-Lugs

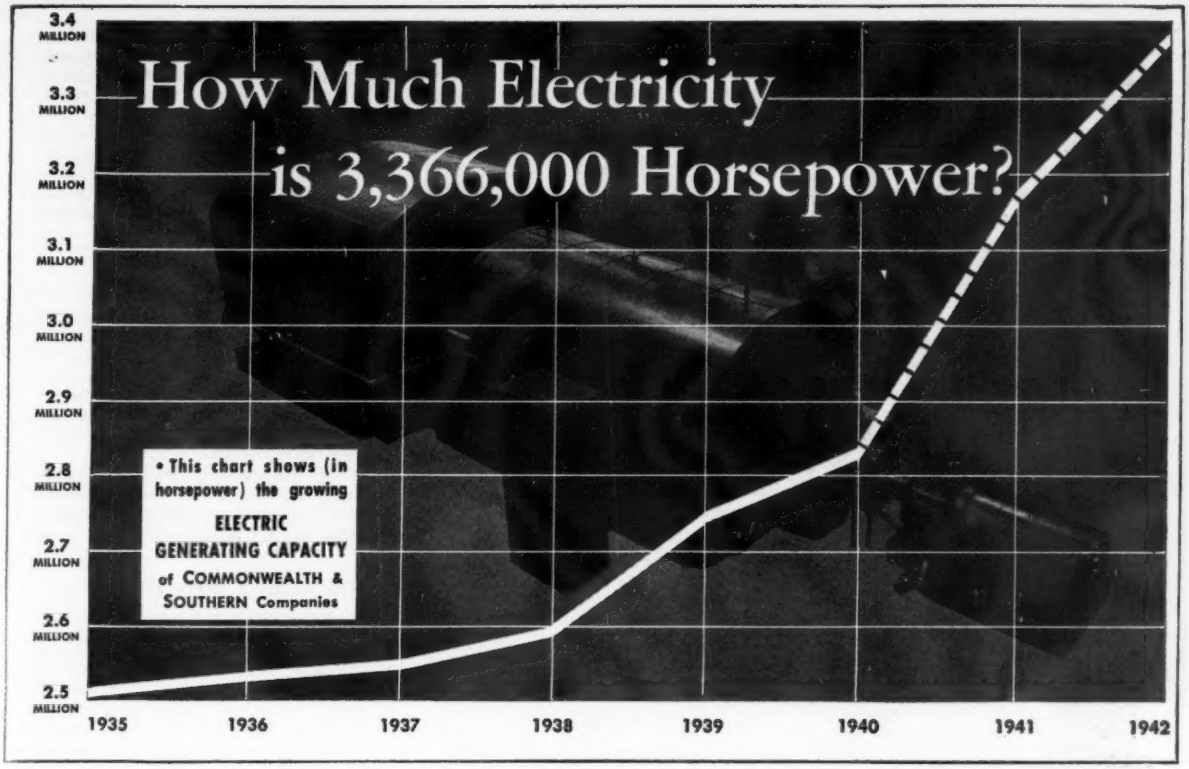
The Trumbull Electric Mfg. Co., Plainville, Conn., have recently announced their re-designed line of Solderless "Handi-Lugs." Five sizes —30-60, 100, 200, 400, and 600 ampere—cover a range of wire sizes, solid, strand or flexible, from No. 14 to 1,000,000 CM single bolt hole. There are three intermediate sizes available for convenience wherever a more limited range of wire sizes is desired.



One of the interesting features of the new design is a through opening by means of which inspection can be made to ascertain that the cable is inserted deep enough into the lug to make full contact. These lugs are tightened by socket head wrenches which come in four sizes.

Benjamin "Lite-Line"

A new fluorescent lighting system to provide more light in a more modern form, at lower cost, and known as the Benjamin "Lite-Line" System, has just been announced by the



THE U.S.S. Colorado, a completely electrified battleship, has an electric power plant of about 40,000 horsepower. Electricity drives this giant ship, even cooks the meals . . . performs a hundred vital tasks. **That 40,000 horsepower is enough to supply all the electricity normally used in over 100,000 homes.**

As it takes about two years to complete a modern powerhouse, electric capacity of Commonwealth & Southern companies, which is available and being installed, is important to the nation as well as to the areas they serve.

Soon, these companies will have a "fleet" of plants with a total minimum electric capacity of 3,366,000 horsepower . . . **an amount probably greater than all the electric energy used on all battleships in the world's major navies.**

A battleship is used merely to illustrate the tremendous growth in power facilities of Commonwealth & Southern companies . . . at a time when electric power also is so vital to the defenses of the nation.

On January 1, 1936 the total electric capacity of Commonwealth & Southern companies, in the ten states where they operate, reached 2,502,000 horsepower.

Since then, one or more new generating units have been put into operation in every year. In 1939, upon the outbreak of the war in Europe, this building program was further stepped up.

At the end of 1940 we had placed in service ten new major generating units and our total electric capacity had reached 2,824,000 horsepower.

And this year, we already have additional new units under construction which will further raise our capacity, by next year, to a level of at least 3,366,000 horsepower . . . a level which is 35% above that of 1935.

Together with scores of urban and rural communities, there are over 25 important industrial cities within the areas served by Commonwealth & Southern companies. Defense contracts running into hundreds of millions of dollars have already been allotted in many of these cities.

Commonwealth & Southern companies are located in five Northern States: Michigan, Illinois, Indiana, Ohio, Pennsylvania . . . and in five Southern States: Alabama, Georgia, Florida, Mississippi, South Carolina.

The Commonwealth & Southern Corporation and affiliated companies will use to the fullest their combined experience and their resources to aid the nation's defense program and for the continued benefit of all of the many communities served.

Justin R. Whiting, PRESIDENT

Greater Strength for the Nation

• A group of companies were brought together in 1930 to form the Commonwealth & Southern companies. Their average home electric rates and the average use of electricity in the homes they served were then almost identical with the averages for the Nation.

Today, home electric rates of Commonwealth & Southern companies average 22% *less* than the average home rate paid in the United States. And, the homes served by these companies are using, on an average, about 34% *more electricity* than other American homes.

More than 19,000 people are now employed in the operation of this business. Many more are at work building new plants and equipment, for which (including all additions to property) we already have expended, since 1936, over $175,000,000.

The Commonwealth & Southern Corporation

LLOYD LEADS

In Quality and Service

SO SAY THOUSANDS

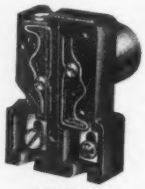
of

SATISFIED USERS

Fluorescent Lamp Holders, Starters and Starter Sockets — recognized as tops by contractors and dealers who demand the best —backed by the approval of leading laboratories.

LLOYD
Starter Socket
Blk. Cat. 252

Has unique "Lobster Claw" Dual Spring Lock.
Insures a contact that can't shake loose.
Pat. Pend.



LLOYD
Lamp Holder with Starter Socket

Cat. 253 — Black Lamp Holder (Cat. 251) combined with Black Starter Socket (Cat. 252).
Cat. 253-W — White Lamp Holder (Cat. 251-W) combined with Black Starter Socket (Cat. 252).
Pats. Pend.
Starter Not Included

LLOYD
Lamp Holder

Cat. 251—Black
Cat. 251-W—White
Lamp inserted by pushing straight into holder where it is *locked*. Removed easily as indicated by arrow.
Pat. Pend.

LLOYD STARTERS

Quick Starting—Longer Life — several times standard specifications.
FS-2 for 15 and 20-watt lamps.
FS-4 for 30 and 40-watt lamps.
Certified by Electrical Testing Laboratories.
FS-6 for 100-watt lamps.

Separate Starter Socket for Remote Mounting

Has the famous Lloyd "Lobster Claw" Dual Spring Lock.
Cat. 352—Pat. Pend.

All Lloyd Products

Listed and Approved by Underwriters' Laboratories Inc.

LLOYD Products Co.

PROVIDENCE, RHODE ISLAND

Representatives in 22 Leading Cities

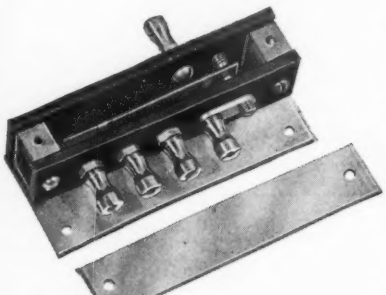
Benjamin Electric Mfg. Co., Des Plaines, Ill.

The significicant features of this Benjamin "Lite-Line" lighting system are: (1) The development of long, continuous light sources which conform to modern architectural trends. (2) Increasing illumination to provide 35 to 100 footcandles on working planes without involving changes in existing wiring. (3) The pioneering in bringing to lighting equipment the greater flexibility and economies of the sectional assembly principle now widely employed in modern building and engineering practice.

These RLM "Lite-Line" Units utilize the 48" Mazda Fluorescent Lamps and are available in single and double reflector lenghts. These units may be joined together in series to form a continuous fixture of any desired length. They may be installed on the ceiling or suspended from the ceiling to the required mounting level for either general or localized lighting. "Lite-Line" Units may also be installed in multiple rows to form unbroken lines of light from one end of the room to the other or they may be used in shorter lengths for localized lighting over work tables, assembly lines, etc.

Time Delay Switch

A new time delay switch, developed to provide a predetermined time delay in electrical control, is announced by Betts and Betts Corp., New York, N. Y. Designed for laboratory and industrial application in conjunction with magnetic relays, and generally used where temperature changes are fairly constant and slight variation in timing are not detrimental. (Special compensating switches



are provided where accurate delay is essential.) The switches are made as small as technically possible without sacrificing the performance. Provided with four terminals, two for the heater coil, two for the main circuit and adjustable within the time limits of one second to five minutes.

Surface Mounting Fixtures

An interesting development in the field of fluoresceht lighting is the introduction of "surface mounting" fixtures that can be used effectively for low ceiling interiors and also to imporve arrangement and add variety to installations that include suspension type fixtures. The Mitchell Manufacturing Company, of Chicago, has just announced two popular priced fluorescent fixtures designed specifically for this purpose. Model No. 2029 is an open type unit employing two 40-watt 48" Mazda lamp bulbs; Model No. 2030, also open type, uses four 40-watt bulbs. Efficiency, beauty and eye-comfort have been combined in both units.

Clamps for Hollow Cables

Completing its line of suspension and strain clamps for hollow copper cables, the Ohio Brass Company, Mansfield, Ohio, now has suitable designs for any type, size or make of cable. These clamps meet the recommendations and requirements of the copper cable manufacturers.

Strain clamps for hollow copper cable includes the principal design features of the company's standard clamps, known as Hi-Lites.

Frank Adam's 50th Year

(Continued from page 38)

great deal of pioneering was done—the Frank Adam Electric Company leading in the development of panelboards and steel cabinets. Starting with wood boxes with wood fronts, the first change was to asbestos-lined wood, then to steel boxes, and finally also to steel fronts. At the same time the fuses on panelboards were changed from open links to enclosed types. Branch circuit switches, originally of the open knife type, were replaced by rotary snap switches, then push button switches and finally tumbler switches.

In 1920 and 1921, the Company invented and developed two very new and important improvements in switchboard and panelboard construction.

One was the dead front sectional panelboard, composed of sections of molded plastic insulating material mounted on a sheet steel mounting back. This replaced live front slate and marble panelboards in which switches, fuses, and current-carrying parts were on the front. The new design permits the construction of panelboards in standardized sections—each section a complete and self-contained unit with all live parts assembled on the rear—any required number of these sections may be assembled into a complete panelboard. When this molded section was invented, panelboards became a **machine-made product,** with greatly increased production possibilities of higher quality.

This meant that new sales territory must be opened, and new customers sought. As a result, the Company now has district offices and resident sales-engineers in some thirty of the more important cities of the United States and Canada.

The second invention was in stage lighting control switches. Up to that time the complete stage switchboard was located in a wing of the stage with the switching equipment exposed. This had proved extremely hazardous, where actors and actress-

es, often in flimsy tinsel costumes, were exposed to the arcing of open type switches when passing back and forth in front of the switchboard. To correct this, the company designed a remote control switchboard having only the pilot control board on the stage. In this way all arcing of switching the load circuits is at the remote controlled switches located in the basement.

Fractional Horsepower Motor Load Tester

(*Continued from page 28*)

tric ovens, used to bake coils and finish pieces of equipment such as armatures and field coils. The ovens are kept at a predetermined temperature of 225 degrees F., and are automatically controlled, a time clock cutting off the heat at a specified time.

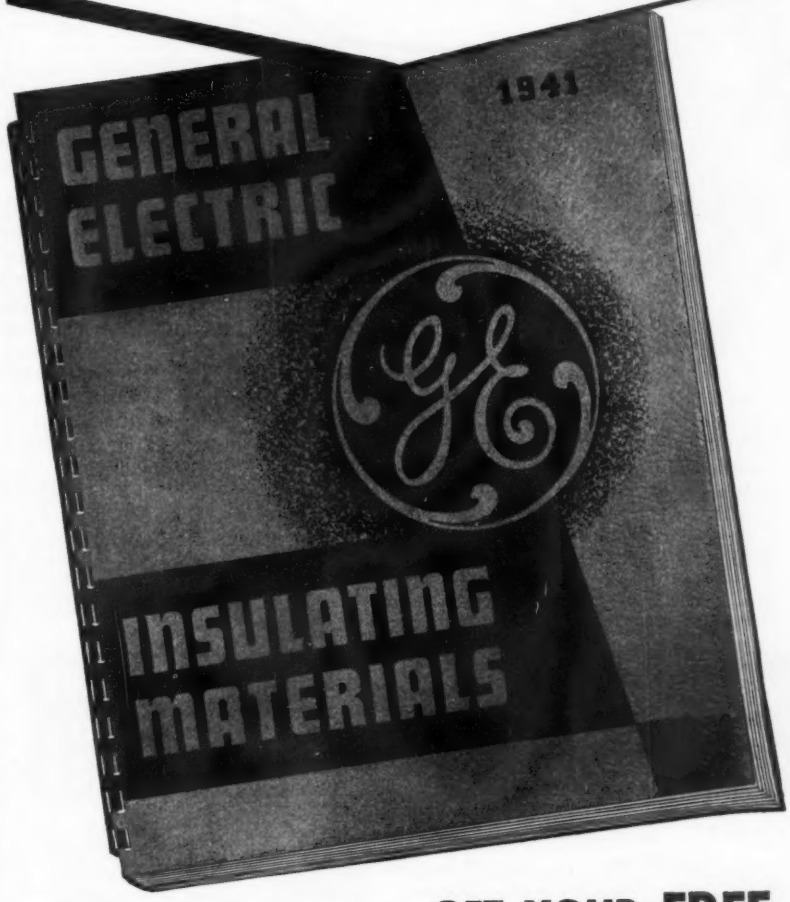
Two rather unusual tools found in the Central Electric shop are line reamers, which are used to ream bearings on electric motors when they are installed, and an armature carbon grinder, especially designed by the firm.

The line reamers line up bearings with one another, so that the closest possible tolerance can be obtained without heating. The reamers expand by jaws slit through bevelled slots. A small saw mounted on a stand comprises the carbon grinder: it is equipped with 1/16-inch carborundum wheels which turn up to 4,000 rpm. The abrasive edge grinds rather than cuts the carbon, producing a smoother and more uniform surface. A hole in the stand is backed up by a suction device to draw the carbon dust out of the air. A static balancing instrument, used to balance armatures, completes the motor repair equipment.

Testing of electrical apparatus is a service featured and solicited by the company, and its equipment is complete. A clip-on ammeter is used to test current demand on motors up to 30 hp on 220 volts; it has a dual scale of 7½ to 75 amperes. It is a hand-tester, with long type split cores, and can be clamped around a single piece of wire, making a transformer of itself.

Two direct /reading ammeters are used to test the current demand on motors, where a scale up to 150 amperes is required. Two colt meters, one with a scale of 0 to 300 volts, and the other scaling up to 600 volts, are used for testing a-c and d-c circuits. Another three-scale meter is used for direct current only, reading up to 150 volts. Another valuable adjunct to the

A NEW CATALOG FOR YOU



The NEW
G-E INSULATING MATERIALS CATALOG
Is Now Available

Crammed with pictures, descriptions, tables, specifications, etc., it consists of an up-to-the-minute listing of General Electric's complete line of outstanding Insulating Materials.

This catalog will be of real help to you when you are planning purchases for installation, repair, and maintenance supplies.

GET YOUR FREE COPY NOW!

Just Use This Coupon
We'll Hurry Your Copy To You

Section M-1166,
Appliance & Merchandise Department,
General Electric Co., Bridgeport, Conn.

Send me a copy of the NEW G-E INSULATING MATERIALS CATALOG right away!

Name.....

Address.....

City.....

GENERAL ELECTRIC

company's field service are three low tension magnetos, used in tracing open and short circuits, which can also be used as portable generators to supply current on a job when necessary.

Follow Through on Range Prospects

(*Continued from page 24*)

used gas ranges than he can trade in. This connection gives him a slight advantage over some dealers who do not have the facilities to dispose of trade-ins.

Furthermore, Bentley also carries new gas ranges for sale and this offers a certain advantage. He can tell the customers that "If you want a gas range, we can sell you," and then go ahead with his story on electric cookery.

Mr. Bentley employs three salesmen, all producers. They work about 10 hours a day and stay on the outside most of the time. They cooperate closely with the home service werkers of the utility company. The latter call continously on housewives showing them how to get the most out of their electric appliances — or add others at little or no extra expense.

Selling the Low-Use Commercial Customer

(*Continued from page 19*)

who has. With your indulgence, I would like to tell you what our folks down in Louisiana did and how they did it. At this point, it may be well to give you some background so that you may better visualize our system and the type of territory served.

The Louisiana Power & Light Company is a transmission line company. It is a young, growing company, only 13 years old. Our revenue in the order of its volume is derived from (1) wholesale sales to other utilities; (2) industrial, and (3) rural towns and communities. There are only 20 customers per mile of line including distribution in towns. (Statistics of the company as of December, 1939, just preceding an intensive campaign directed toward low-use customers, are given in the accompanying tabulation.)

Some of the outstanding features and results of the intensive campaign which we directed toward the low-use or unsold commercial customer are presented in the following outline. The campaign began April 1, 1940, and extended through September, 1940.

1. The Objective

To give special sales emphasis to low-use customers and to decrease the number whose annual use was less than $60.

2. The Plan

Made a zone analysis of all commercial customers in September 1939.

Set-up individual customer record sheets by districts in meter route order. Marked each unsold customer sheet.

Set daily salesman's quota of a minimum of four calls on these unsold customers in meter route order to insure full coverage at minimum expense.

Used lighting kit for demonstration purposes featuring inexpensive screw-in commercial fixtures. Required that salesman demonstrate this equipment to each unsold customer.

Prepared a "canned" sales story for the salesman for making the demonstration and for selling lighting.

Sent out a direct mail piece at beginning of campaign to all commercial customers.

Required that salesmen carry their lighting handbook-visualizer, "Lighting the Way to More Profits" and use it on each call.

Since there were no dealers selling this type of equipment, salesmen sold lighting, then the equipment. Terms including carrying charges, were extended when required.

This campaign was built primarily upon inexpensive lighting equipment and proper size bulbs.

Sales of equipment to customers other than those ear-marked prior to campaign as "unsold" were not counted.

Dealers were appraised in advance of the activity, and were urged to participate and were given an opportunity to purchase from jobbers the inexpensive equipment selected. Little interest was evidenced by them at the time.

3. The Results

The results of this campaign directed toward low-use or unsold commercial customers are given in the accompanying tabulation. Other details that may be of interest are as follows:

Number of Sales Calls Made	2,814
Total Kw Added	298
Wattage Added per Call	106
Total EAR Secured	$78,800
EAR per Call	$2.80
Kw Increase over 1939 Activity	114

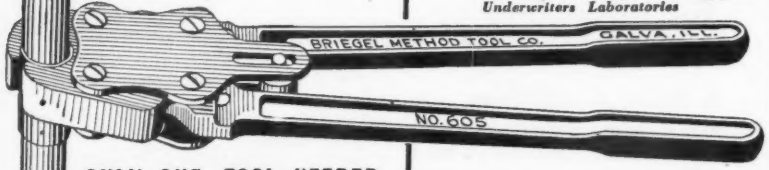
Since this campaign was carried along with our regular commercial sales activities, no additional personnel or great increases in travel expenses were involved. Increment cost of the activity was as follows: bonuses to salesmen, $298; direct

Save 25% . . . in Material and Connecting Time
WITH B-M CONNECTORS AND COUPLINGS

Popular, Simple Method

Saves 25% on material, 25% to 50% of connecting time. Makes installations quick and easy. Eliminates complications and ends fussing with nuts to tighten.

Approved by Underwriters Laboratories



ONLY ONE TOOL NEEDED

Costs you only $1.25 for the patented B-M indenter (½" size handles 80% of all installations). Just two squeezes, and you have a smooth, neat connection. No other tools required. This tool can save you many times its cost on the first job.

STRONG, NEAT CONNECTIONS

You welcome the speed and ease that the B-M system puts in your hands. These fittings give you complete, *well finished* work in a hurry—on all average jobs (they're non water-tight).

Distributed by

The M. B. Austin Co. Chicago, Ill.	Clifton Conduit Co. Jersey City, N. J.	The Steelduct Co. Youngstown, Ohio	National Enameling & Mfg. Co. Pittsburgh, Pa.
Clayton Mark & Co. Evanston, Ill.	General Electric Co. Bridgeport, Conn.	Enameled Metals Pittsburgh, Pa.	Triangle Conduit & Cable Co. Elmhurst, New York City.

BRIEGEL METHOD TOOL CO., Galva, Ill.

2000% Extra Dial Power

Paragon Series 300

PARAGON TIME SWITCHES

THE Paragon Series 300 Time Switch has 2000% more dial power than required. The one and only time switch with just two exposed gears. All others operate in a sealed, oil filled chamber. Positively dustproof. Guaranteed for 20 degrees below zero. Approved by Underwriters. Because of Paragon's experience and large volume production, the price is only $13.00. PARAGON ELECTRIC COMPANY, 409 South Dearborn Street, Chicago, Illinois.

Southern Representatives

William E. Hopper, 357 Marietta Street, N. W., Atlanta, Georgia

George E. Anderson Co., Santa Fe Building, Dallas, Texas

Large Stocks for Immediate Shipment in Atlanta and Dallas

Paragon Chicago

BUILDERS OF CONTROL INSTRUMENTS SINCE 1905

Profitable Opportunities For You WITH AUTOMATIC TIME CLOCKS

Window Lights . . . Electric and Gaseous Tube Signs . . . Apartment and Hotel Hall Lights . . . Billboards . . . Flood Lighting . . . Poultry House Lighting . . . Linotype Machines . . . Pumps and Motors . . . Electric Refrigerator Defrosting . . . Time Lock Safes and Vaults . . . Street Lighting Systems . . . Traffic Signals . . . Signal and Alarm Systems . . . Appliance Outlets . . . Water Softening Equipment . . . Advertising Displays . . . Ventilating Systems . . . Attic and Exhaust Fans . . . Electric Fountains . . . Air Conditioning Equipment . . . Electric Hot Water Heaters . . . Compressors . . . Oil Well Pumps . . . Battery Charging . . . Sprinkling Systems and many others.

Write for Information and Discounts

Automatic Electric Manufacturing Co.

MANKATO • MINNESOTA

COOLVENT

THE LOW COST SYSTEM of Home Ventilation

AUTOVENT 25th ANNIVERSARY

Complete! — Compact! — Certified! Quiet operation . . . built to endure. Write for new sales literature.

CERTIFIED RATINGS — MEMBER OF NAFM

Distributed by Leading Electrical Jobbers

ALL OVER THE SOUTH

AUTOVENT FAN & BLOWER CO.

1825-27 N. Kostner Ave., Chicago, Ill.

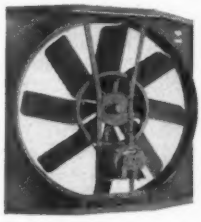
"Never a Complaint on a Coolair Fan . . ."

TRADE MARK

. . . and we have them installed in every type of building from small homes to large laundries and factories."

That's the amazing statement of Mr. W. G. Givens, Electrical Department Manager for Fones Brothers Hardware, Co., Little Rock, Arkansas, formerly District Merchandise Manager for the Arkansas Power & Light Co., and distributor of Coolair home-cooling and commercial fans for more than five years.

"After long experience with both cheap and quality attic fans," says Mr. Givens, "I am firmly convinced that a quality fan such as Coolair gives the customer a lot more for his money and is much more satisfactory to the dealer from the standpoints of profit and customer goodwill."



New, improved Coolair Home-Cooling Fan.

Patented sound-absorbing springs, oversize ball bearings, welded all-steel construction, finest long hour service motors, a fan size for every type of job . . . these are features of the Coolair line that practically eliminate costly service calls and bring bigger profits to Coolair dealers!

Why not cut yourself in on these Coolair profits? FREE illustrated catalogs, direct mail pieces, local newspaper ad mats and other sales helps are ready for you. Write today for details and franchise information.

New Coolair Attic Package, complete with fan and automatic ceiling shutter, greatly simplifies installation.

MAIL THIS COUPON TODAY!

American Coolair Corporation, Jacksonville, Florida

Please send me information on the complete line of Coolair fans.

Name _____

Address _____

City _____ State _____

Coolair Ventilating and Cooling Systems

AMERICAN COOLAIR CORPORATION

Manufacturers . . . . JACKSONVILLE, FLORIDA

VITAL

-keeping your lines

GOING!

TRANSMISSION line breaks or crippling "shorts" *can* cost you more than a whole year's scientific tree-trimming!

Expert tree-trimming costs little—saves much. It keeps trees blameless in power failures. It removes *one* risk of sabotage from national defense—and an important one, mind you. Better look into this—now.

●

NATIONAL DEFENSE DEMANDS

uninterrupted Power

ASPLUNDH

TREE EXPERT COMPANY

HOME OFFICE
JENKINTOWN, PA.
OGONTZ 3750

CHICAGO, ILL. Randolph 7773	ALEXANDRIA, VA. Alexandria 3581
BINGHAMPTON, N.Y. Binghampton 4-5314	NEW CASTLE, PA. New Castle 2285
COLUMBUS, OHIO Adams 5432	RUTHERFORD, N. J. Rutherford 2-7434
PITTSBURGH, PA. Atlantic 9798	CAMBRIDGE, MASS. Kirkland 5330
WASHINGTON, D. C. Shepherd 5249	DURHAM, N. C. Durham X5544
BALTIMORE, MD. Glenburnie 790J	OMAHA, NEBRASKA Atlantic 8305

UTILITY CONTRACTS EXCLUSIVELY

Here's America's *he-man* tree—the proud white oak. Highly useful commercially.

Highly destructive electrically. But we can save your lines — and the white oaks, too.

mail pieces, $350; total, $648.

Increment cost of results during the campaign: cost per dollar of EAR, 0.8c; cost per dollar of revenue secured during campaign, 6.45c.

Total cost of the activity (based on 1/3 of salesman's total time and expense); total cost, $4,048; cost per dollar of increased revenue, 40c; and cost per dollar of EAR, 05.1c.

Wiring Adequacy Promoted in Dallas

(Continued from page 14)

day and future electrical demands throughout the anticipated life of the property — and represents a tangible addition to house values.

Service includes approval of wiring plans by the Dallas Adequate Wiring Committee, inspection during construction, affixing of a permanent seal of approval to the electrical distribution panel of the house, and the award of a duly attested certificate to be added to the owner's papers.

The electrical angle in selling the houses is featured prominently because the modern house buyer demands a house that is modern electrically.

State Licensing Laws Affecting Contractors

(Continued from page 11)

to engage in the public contracting business, without limitation as to the value of a single contract, costs $200; while a class-B license, restricting the contractor to public contracts none of which is in excess of $50,000, costs $100, and a class-C license, entitling the holder to engage in single contracts not over $25,000 each, costs $10.

Licenses issued under the provisions of those laws are good for a period of 1 year, and may be renewed upon the payment of a renewal fee ranging from $5 to $100. Generally the licenses expire at the end of the calendar year, but in 4 States (Arizona, California, Michigan, New Mexico) they expire in June of each year.

In most of the States all architects and engineers, preparing plans and specifications for work in the respective State, must include in the invitations to bidders a copy of the act indicating that it is necessary for the contractor to show evidence of a license before his bid will be considered.

There are numerous exceptions to those laws relating to general contractors. A typical example is the Arizona statute which exempts from its coverage the following: (1) An authorized representative or representatives of the United States Government, the State of Arizona, or any county, incorporated city or town, irrigation district, reclamation district, or other municipality, or political corporation or subdivision of the State; (2) any construction or operation incidental to the construction and repair of irrigation and drainage ditches of regularly constituted irrigation districts or reclamation districts, or to farming, dairying, agriculture, viticulture, horticulture, or stock or poultry raising; (3) trustees of an express trust, or officers of a court, providing they are acting within the terms of their trust or office, respectively; (4) public utilities operating under regulations of the State corporation commission on construction work incidental to their own business; (5) any construction or operation incidental to the discovering or producing of petroleum or gas, or the drilling, testing, abandoning, or other operation of any petroleum or gas well when performed by the owner or lessee; (6) sole owners of property building structures on such property for their own use; and (7) work on one

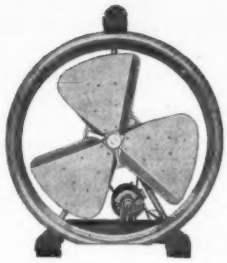
In St. Louis, Hotel Mayfair is the choice of seasoned travelers. They appreciate its downtown location and enjoy its friendly, restful atmosphere, courteous service, comfortable rooms and its restaurants where fine food and drink are traditional.

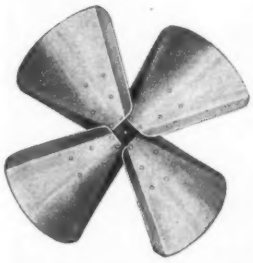
Every room has private bath, guest-controlled radio. Rates: 50% of all rooms $3.50 or less, single; $5.00 or less, double.

HOTEL Mayfair
Eighth & St. Charles • St. Louis, Mo.
Nearby Parking and Garages

The FRESH-AIR MAKER

● Designed to give you a fast selling fan of high quality construction and fine appearance—Fresh-Air Makers are beautifully balanced, quiet and efficient in operation yet competitively priced—30″, 36″, 42″, 48″ diameters.





Or you can simplify your job if you build your own fans by the purchase of a proven, standard fan blade—individually packed—carefully balanced—three or four bladed type in 30″, 36″, 42″, 48″ diameters.

Write for further details and prices.

BLOWER DIVISION
SCHWITZER-CUMMINS COMPANY
125 FAN STREET INDIANAPOLIS, U. S. A.

INSTANTANEOUS *Electric* HEATERS

HOT or COLD WATER from the SAME FAUCET—when you want it.

• • • The Instantaneous Electric Water Heater is not a portable lamp socket device, but—as shown—is a compact, self-contained apparatus (10½x4¼ inches). Quickly and inexpensively installed. Operates on AC.

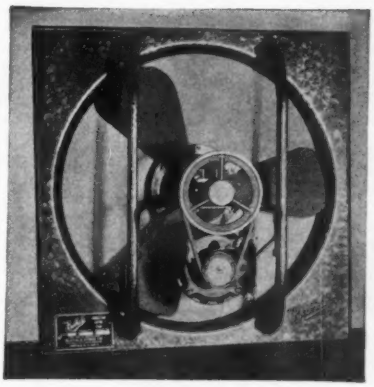
Approved by Underwriters Laboratories, Inc.

DISTRIBUTORS WANTED

Mfg. By THE ELECTRIC HEATER COMPANY
BRIDGEPORT, CONNECTICUT, U. S. A.

WHEN THE MERCURY HITS A NEW HIGH - -

it's a cinch to sell comfort



● No high pressure salesmanship is needed to prove the logic of *Breez-Air* home cooling. Actually, it's a cinch to cash-in on this thrifty way to summer comfort! And the soaring mercury is on *your* side!

Note the simple arrangement shown below. A quiet, efficient *Breez-Air* Fan is installed in the attic. Operated after sundown, it pushes out air—provides modern cooling throughout the sultry summer months.

When you recommend a Buffalo *Breez-Air* Fan for the job, you're sure to make a hit with the customer. *Breez-Air* Fans are quiet in operation, economical to run, and practically never need attention.

Active sales ahead! Better get started on this popular home cooling idea *right now.*

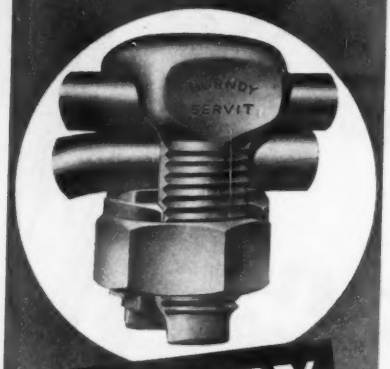
SALES AMMUNITION

Yes, plenty of it to start home-owners in your locality asking about this low-cost way to enjoy summer weather. Write NOW for full details.

BUFFALO FORGE COMPANY
210 Mortimer St. Buffalo, N. Y.

"Buffalo" BREEZ-AIR FAN
The Quality Home Cooling Fan

FORGED-IN STRENGTH



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BURNDY ENGINEERING CO., INC.

ATLANTA, GA.....W. R. Calverly
TAMPA, FLA. ..... Pat Baldwin, Inc.
SUMMERVILLE, S. C.....J. P. Voight
NEW ORLEANS, LA....Electron Eng. Co., Inc.

SELL *Revere* LIGHTING
THE LINE THAT MEETS DEFENSE REQUIREMENTS

You Can Do a Big Pole Business

STEEL FLAG POLES, 20 to 60 Feet High — HINGED FLOODLIGHT POLES, 20 to 30 Feet High — RIGID FLOODLIGHT POLES — 24 to 60 Feet High.

FLOODLIGHTS FOR EVERY REQUIREMENT

Revere open and enclosed floodlights "Top the Field" in design, engineering and efficiency . . . the result of years of specialization and research.

Low mounting convertible flood for Sports, Service Station and Industrial use.

The Hinged Pole lowers floodlight for ground level cleaning. Promotes safety.

Have you the new 1941 Revere Catalog? Write for it today.

REVERE ELECTRIC MFG. CO.
2949 NORTH PAULINA STREET · CHICAGO
Originators of the Hinged Floodlight Pole
INDOOR and OUTDOOR LIGHTING EQUIPMENT of EVERY DESCRIPTION

project by contract performed directly or indirectly by one contractor when the aggregate price, including labor, material, and all other items is less than $500. Although similar exceptions are contained in most of the statutes, there are several laws in which they are more limited.

Penalties for Violations

Finally, each of the laws provides a penalty for violation of its provisions. Briefly, this provision declares that any person, firm, or corporation who gives false or forged evidence to the board in obtaining a certificate of license, or falsely impersonates another, or uses an expired or revoked license is guilty of a misdemeanor. The punishment for such violation of the act ranges from $100 to $500 for each offense, with imprisonment from 1 to 6 months; and the majority of the statutes provide that the court, in its discretion, may both fine and imprison the offender.

Speed Essential in Defense Contracts

(*Continued from page 10*)

The warehouse, except the stockroom, and the smaller buildings are lighted by 175 200-watt incandescent lamps in RLM dome reflectors. The stockroom has its own specialized lighting-system. This is provided by 35 bin-and-stack luminaires, designed to reduce "blacked-out" areas on shelves or in bins.

Outside protective-lighting is furnished by nine 16-inch, wide-beam 1000-watt Alzak floodlights for night-illumination of the grounds surrounding the plant, and 25 multiple obstruction-lights mounted on roof-tops to serve as warnings to low-flying aircraft.

Given the "go ahead" signal for this job on February 19, the Wagner Electric Company had the wires "hot" in No. 1 and No. 2 buildings 58 days later. The other buildings then were not completed to the point where this was possible.

Favoring the Wagner firm was the ability of the Hardy Electric Company, which supplied the wiring and current-distribution materials, to make immediate delivery on these items. Another favorable element was the fact that the work started during the between-season lull, when competent working personnel was available in sufficient quantity.

As its own contribution, Wagner brought to the job in hand a broad experience in high-speed electrical installations. Among the company's most recent contracts were the 18-story Tarleton Hotel and the Beach Theatre at Miami Beach. The latter job, including stage-lighting equipment, was completed in 30 days.

On the Intercontinent job work was speeded by the employment of time-saving power tools, such as electric drills, hydraulic pipe-bender and electric "mules" (pipe-threaders) in two sizes. Portable metal stagings facilitated under-roof installation.

Principals in the Wagner Electric Company are Louis Wagner, president, and Ray Roberts, vice president. Installation was directed by Wm. L. (Bill) Thurman, widely known throughout the South.

FOR SALE

2—25 K.W. 110 volt Direct Current Westinghouse Turbines. Can operate at 125 lb. steam pressure, atmospheric exhaust.
1—3 Panel Westinghouse Switchboard. Two of the panels are for the above generators, while the three panels contain switches for distributing circuit.
Price ..... $750.00 each

M. Kaplan & Son,
Corner 9th & Adams Sts. Monroe, La.

You'll like the Lennox in St. Louis, too. Here in a handy downtown location, you'll find cheery, comfortable surroundings . . . sleep-inviting beds, famous food and drink . . . everything to make your stay pleasant.

All rooms have private bath and guest-controlled radio. Rates: 50% of all rooms $3.50 or less, single; $5.00 or less, double.

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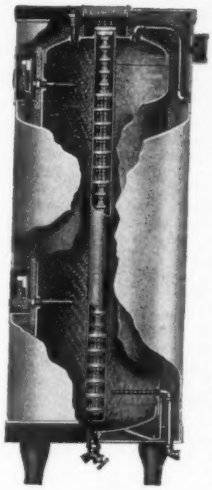
Nearby Parking and Garages

COMPARE *these SEPCO Advantages with any other Electric Water Heater, and see the Difference*



14 Distributors Serving the South

HEATING UNIT—The famous Vertical Heating Unit promotes rapid heating due to internal circulation, and operates at "black heat," insuring long life.

THERMOSTAT—New snap-action vapor tension type—sensitive bulb is directly in water for instant response to temperature changes. Thoroughly reliable and accurate.

300-LB. TEST PRESSURE TANK—supplied in copper-bearing steel, heavily galvanized, or electrically welded Tinned Everdur (97% copper alloy with the strength of steel).

HEAT TRAP—One-piece seamless copper tubing forms a seal to prevent heat losses from recirculation of hot water in hot water piping.

COLD WATER DIFFUSER— Patented Helical Diffuser Tube prevents mixture of incoming cold and hot water, assuring over 80% of tank capacity before drop in outlet temperature.

These, and other features in SEPCO Electric Water Heaters, can change "prospects" into "customers." For further information, write AUTOMATIC ELEC. HEATER CO., Pottstown, Pa.

1915 **SEPCO** *1941*
ELECTRIC WATER HEATERS

C. B. ROGERS

ELECTRICAL HEATING ENGINEER
CHROMALOX
ELECTRICAL HEATING UNITS
and
CHROMALOX
EQUIPPED PRODUCTS

1000 PEACHTREE STREET
ATLANTA, GEORGIA

Replacements in a single service call

WITH CHROMALOX RANGE UNITS

Fit any electric range from a small stock of these units. Reduce inventory. Make replacement business quick and profitable.
Sell ranges equipped with Chromalox units and you will sell more ranges. Write for your copy of "How to Sell More Ranges."

See nearest representative
ATLANTA, Ga. — C. B. Rogers, 1000 Peachtree St.
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EDWIN L. WIEGAND CO., 7600 Thomas Blvd., Pittsburgh, Pa.

ONLY Sturtevant GIVES YOU ALL THESE!

Wind-O-Vane Fan

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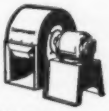

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You get the product of the World's Largest Manufacturers of Air Handling Equipment.

You get all of the advantages which only 81 years of air engineering experience can assure.

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101. SERVICE EQUIPMENT AND LOAD CENTERS—Service Equipment, Load Centers and Panelboards assembled with Type AC circuit breakers are listed in this new publication. In addition to considerable general information, it includes specifications and price data. Frank Adam Electric Company, St. Louis, Mo.

102. BUSDUCT AND ACCESSORIES—This sixteen-page booklet gives complete descriptive data and specifications on Busduct Distribution Systems for Light and Power. Of particular interest is the suggested specification for Feeder Busduct Distribution Systems. Frank Adam Electric Company, St. Louis, Mo.

103. SWITCH AND OUTLET BOXES—Cubic inch capacity is given for many types and sizes with interpretation of National Electrical Code. New Racolets in many types. All-Steel-Equip Co., Aurora, Ill.

104. SHOP EQUIPMENT—Shop Boxes, Stacking Boxes, and Taper Pans for handling and storing small parts. Tool Boxes, Tool Cabinets, and Bench Drawers. Illustrated catalog shows many uses. All-Steel-Equip Co., Aurora, Ill.

105. COOLAIR HOME-COOLING FANS—FORM 141—Complete descriptions of 1941 Coolair single and twin attic fans, window fan and new automatic ceiling shutter. Also contains valuable installation suggestions. Designated as Form 141. American Coolair Corp., Jacksonville, Fla.

106. COOLAIR ATTIC PACKAGES—FORM 241—Complete descriptions of 1941 Coolair single and twin attic packages, including fan, vent box and newly developed gestions. Designated as Form 241. American Coolair Corp., Jacksonville, Fla.

107. COOLAIR PRICE SHEET—FORM 341—Complete performance data, dimensions, prices and shipping weights on 21 sizes of Coolair home-cooling and commercial fans; also blowers and accessories. Designated as Form 341. American Coolair Corp., Jacksonville, Fla.

108. AMARINE NON-LEADED SUBMARINE CABLES—FORM 6118—An attractive, 16-page booklet on Submarine Cables, with illustrations of various applications and descriptions of typical installations. Copies may be obtained by writing the American Steel & Wire Co., Rockefeller Bldg., Cleveland, Ohio.

109. TIME SWITCHES—Folder on Time Switches with a short description of the new line of Time Switches ranging from 770 to 4,950 watts per pole in capacity, and in single, double, and triple-pole types. Both single-throw and double-throw models are available. Automatic Electric Mfg. Co., Mankato, Minn.

110. AUTOMATIC FLASHERS — A complete line of Flashers including all types and arrangements of circuits for every conceivable flashing effect. These include both standard, or heavy-duty models, and a line of Utility models which are just as ruggedly constructed and as durable, but are designed for small loads where the more expensive installations of heavy-duty Flashers are not warranted. Automatic Electric Mfg. Co., Mankato, Minn.

111. NEW CORY CATALOG—The new merchandising features presented in this new catalog are free spare glass with famous CORY Assortments—also the new CORY Glass Filter Rod-Funnel Holder Dollar Combination which makes these needful accessories available to all users of Glass Coffee Makers. Glass Coffee Brewer Corp., 325 No. Wells St., Chicago, Ill.

112. TELEPHONE & CODE CALL EQUIPMENT—A new Bulletin No. 108 is available describing the new Couch "Autophone" System of automatic telephones which incorporates valuable features among which is a Code Call circuit which may be used in conjunction with the telephone system. This system is designed for industrial, commercial and institutional buildings. S. H. Couch Company, Inc., North Quincy, Mass.

113. INTERPRETING THE NEW CODE IN TERMS OF NEW BUILDING WIRES—A new booklet describing the rulings on thin, heat-resisting and synthetic insulations are carefully simplified. The ratings of the newly recognized types of wires and the new ratings for Type R are graphically shown in tables for both the new and rewiring classes of work. General Cable Corporation, 420 Lexington Avenue, New York, N. Y.

114. IDEAL PRODUCTS CATALOG — A special 25th anniversary catalog has just been issued describing the complete line of Ideal Products. Electrical Contractors, Motor Rewinders, and Industrial Maintenance Electricians will be particularly interested in this comprehensive publication. Ideal Commutator Dresser Co., 1270 Park Avenue, Sycamore, Ill.

115. FLUORESCENT LIGHTING ACCESSORIES—Spring Bulletin No. 2, describing and illustrating complete Lloyd line of Fluorescent Lamp Holders, Starters, Starter Sockets and Holder and Socket combinations. Lloyd Products Company, Providence, R. I.

116. "PLUG-IN" STRIP CATALOG—This twenty-eight page booklet includes a wide range of application data and specifications on "Plug-In" Strip. Constructors will find the actual insulation diagrams and instructions of particular interest. National Electric Products Corp., Pittsburgh, Pa.

117. MECHANICAL CONNECTORS—First Aid for electrical systems through the use of mechanical connectors is the subject of an interesting twenty-page booklet now available. In addition to specific construction and sales of the new "Gorilla Grip," this booklet describes a wide range of mechanical connectors for every size and purpose. National Electric Products Corp., Pittsburgh, Pa.

118. HOME VENTILATION—FORM 347—Describing benefits of home ventilation with methods of sizing and installing units. Six pages. Profusely illustrated. Schwitzer-Cummins Company, 1145 East 22nd Street, Indianapolis, Indiana.

119. COMMERCIAL VENTILATION—FORM 402—A four-page bulletin pointing the way to increase dealer profit through the sale of ventilation to stores, restaurants, taverns, etc. Illustrated. Schwitzer-Cummins Company, 1145 East 22nd Street, Indianapolis, Indiana.

120. SQUARE D COMPANY announces the Spring issue of the Square D Digest, dated April, 1941. This condensed catalog contains listings and the latest prices of many Square D products, including Safety Switches, Service Equipment, Multi-breakers and other Circuit Breakers, Panelboards, Motor Control and Pressure Switches. Square D Co., Detroit, Michigan.

121. NEW WIRE CATALOG—A new catalog just issued by the United States Rubber Company contains complete specifications for every type of building wire and cable—single conductor and multiple conductor, rubber insulated and synthetic insulated, fibrous covered and lead covered. United States Rubber Co., Rockefeller Center, New York, N. Y.

122. 100-WATT FLUORESCENT LUMINAIRES FOR INDUSTRY—Designed especially to furnish higher illumination intensities in industry, new 100-watt fluorescent luminaires are described in a 4-page leaflet, F-8604, recently announced by Westinghouse Electric and Manufacturing Company. A copy of F-8604 may be secured from Department 7-N-20, Westinghouse Electric and Manufacturing Company, East Pittsburgh, Pa.

123. NEW FOLDER DESCRIBES WATER COOLERS—Water coolers for general industrial and office use are described in a new 8-page illustrated folder announced by Westinghouse Electric and Manufacturing Company. Copies of folder 1WC-0201 may be secured from department 7-N-20, Westinghouse Electric and Manufacturing Company, East Pittsburgh, Pa.

124. FOUR NEW Y. P. S. CABINET SINKS are shown on a new two-color wall poster. There are provisions made for prices on each model and the poster carries full description of each sink. Folder designated as No. 1054. Youngstown Pressed Steel Division of Mullins Manufacturing Corporation, Warren, Ohio.

125. Y. P. S. SINKS—Folder No. 1056 shows the complete line of eleven sinks now manufactured by this company. These eleven sinks vary in price from the lowest priced sink of standard specifications to the greatest dollar value in 66-inch double bowl sinks. Youngstown Pressed Steel Division of Mullins Manufacturing Corp., Warren, Ohio.

126. WIRING DEVICES—"Arrow" catalog No. 27 and "H&H" catalog No. "X". 100 pages, lists the complete line of quality, dependable wiring devices, including switches, receptacles, sockets, and plug material. The Arrow-Hart & Hegeman Electric Company, Hartford, Conn.

127. MOTOR CONTROL APPARATUS—"Arrow—H&H" catalog No. 8, 94 pages listing Magnetic and Manual Starters, Push Button Stations, Enclosed Switches, Relays, Service Equipment and Circuit Breakers. The Arrow-Hart & Hegeman Electric Company, Hartford, Conn.

128. CATALOG 411—dated May, 1941, illustrates, describes and prices the various BullDog standard product lines consisting of safety switches, service equipment, light and power panelboards, circuit breaker panelboards, KBL-Duct, compact type VACU-Break switchboards. BullDog Electric Products Co., 7610 Jos. Campau Ave., Detroit, Mich.

129. BULLETIN 403 on BullDog enclosed bus bar system of electrical distribution for commercial and industrial use. Forty-four pages of construction details, applications, dimensional data and technical charts. BullDog Electric Products Co., 7610 Jos. Campau, Ave., Detroit, Mich.

130. 1941 FRIGIDAIRE REFRIGERATORS are described in this colorful book. Included are full page, color pictures of various models together with specifications and descriptions of features. Frigidaire Div., General Motors Sales Corp., Dayton, Ohio.

131. 1941 FRIGIDAIRE ELECTRIC RANGES featuring new Radiantube Units, striking modern designs and other improvements are fully described in this 16 page, full-color book. Frigidaire Div., General Motors Sales Corp., Dayton, Ohio.

132. INDUSTRIAL WIRING HANDBOOK: This 48-page handbook, called "Adequate Wiring for Industry," describes modern factory wiring methods and materials. Wiring practices adaptable to all factories are outlined. Publ No. 51-4011. General Electric Co., Appliance and Merchandise Dept., Bridgeport, Conn.

133. FARM WIRING HANDBOOK: Requirements for adequate wiring on average farms are given in this 32-page handbook. Layout and installation procedures are suggested and necessary materials are described. Pub. No. 51-924-1. General Electric Co., Appliance and Merchandise Dept., Bridgeport, Conn.

134. HOME WIRING HANDBOOK: G-E Home Wiring methods designed to provide full adequacy are described in detail in this 28-page handbook. Material specifications for residence wiring are given and other pertinent information. Pub. No. 51-4014. General Electric Co., Appliance and Merchandise Dept., Bridgeport, Conn.

135. "THE POOR WIFE'S REVENGE": This is an interesting 16-page consumer booklet which emphasizes the importance of adequate wiring in existing homes and new homes. Tells its story in pictures. Pub. No. 51-4012. General Electric Co., Appliance and Merchandise Dept., Bridgeport, Conn.

136. CORD CATALOG: This catalog contains detailed information on G-E portable cords. Included are all-rubber cords, braided cords and Deltabeston asbestos-insulated cords. 24 pages. Pub. No. 51-402. General Electric Co., Appliance and Merchandise Dept., Bridgeport, Conn.

137. SMALL DIAMETER BUILDING WIRE: Information about Flamenol, Type SN small diameter building wire is available in a 4-page illustrated bulletin. Uses in modernizing existing conduit wiring systems are explained. Pub. No. 58-4013F-1. General Electric Co., Appliance and Merchandise Dept., Bridgeport, Conn.

138. TYPE S ALL-RUBBER CORD: A 12-page folder on General Electric's Type S Cord, CORDX, explains new method of construction which gives greater flexibility. Pub. No. 58-4104-1. General Electric Co., Appliance and Merchandise Dept., Bridgeport, Conn.

139. UNDERFLOOR RACEWAY MANUAL: This publication is a combined manual and catalog on G-E Fiberduct underfloor fiber raceways which permit easy addition of outlets. Pub. No. 53-4018. General Electric Co., Appliance and Merchandise Dept., Bridgeport, Conn.

140. WIRING MATERIALS: A series of folders on different G-E Wiring Materials are available, including: Pub. No. 54-4102-1 on wiring devices; Pub. No. 58-4106-1 on Type RW wire; Pub. No. 58-96 on rubber-insulated building wire; Pub. No. 58-4014F-1 on Flamenol Type SN wire; Pub. No. 54-814-1 or fuses; Pub. No. 53-408 on conduit boxes; Pub. No. 53-402 on conduit, BX, BraidX, etc.; Pub. No. 54-83 on mercury switches; Pub. No. 54-63-1 on branch-circuit circuit breakers; Pub. No. 51-4118 on G-E Home Wiring. General Electric Co., Appliance and Merchandise Dept., Bridgeport, Conn.

141. NEW FLUORESCENT BOOKLET — "How to Speed Sales with G. E. Fluorescent Lighting." This booklet reviews the progress of lighting since the year 1602 up to the present time and is completely illustrated with pictures, charts and recommendations for modern fluorescent illumination. Lamp Department, General Electric Company, Nela Park, Cleveland, Ohio.

142. ELECTRICAL CONDUIT: Complete technical information on corrosion-resisting asbestos-cement ducts for underground and overhead service, with and without concrete envelop, is included in "Transite Conduit and Korduct for the Electrical Industry," DS Series 410. Johns-Manville, 22 East 40th Street, New York, N. Y.

143. CELL STRUCTURES AND DOORS: Technical Data Series 426 contains complete information on Trancell, lightweight, fireproof sheet material for housing electrical equipment. Various types of materials and typical constructions are included. Johns-Manville, 22 East 40th Street, New York, N. Y.

144. UNIVERSAL ELECTRIC RANGES—Complete line folder giving features of models in Universal 1941 line of electric ranges and telling "Precision Cooking" story. Folder No. 6420. Landers, Frary & Clark, New Britain, Conn.

145. UNIVERSAL GLIDER IRON—Attractive full line iron folder featuring Universal Glider Iron. Order by number, No. 1098. Landers, Frary & Clark, New Britain. Conn.

146. ATTIC VENTILATION: New bulletin giving complete information about all-electric, dependable, trouble-free Timers for automatic control of attic fans. Mechanism timed and operated by slow-speed, self-starting synchronous motor. No clock works. Bulletins available on other Timers and Time Switches. Paragon Electric Company, 409 South Dearborn Street, Chicago, Ill.

147. TIME SWITCHES: Bulletin on New 300 Series. The only Time Switch with just two gears in the open—all others operate in a sealed oil-filled chamber. Dust proof. Ideal for signs and general time switch applications. Paragon Electric Company, 409 South Dearborn Street, Chicago, Ill.

148. LITTLE GIANT RELAY—A new small Relay for use on A. C. or D. C. is described in a Ward Leonard Bulletin No. 105. The Relay is available in single pole, single or double throw contacts. On standard frequencies, coils can be obtained for 6 to 230 volts. Complete information on contact rating is given in the bulletin. Ward Leonard Electric Co., Mount Vernon, N. Y.

149. ELECTRIC RANGE UNITS: Chromalox Bulletin CF-107 lists proper assembly and adaptor ring to fit any range, regardless of age or make. Inventory investment and servicing reduced to minimum. Units same as used on many makes of new ranges. Edwin L. Wiegand Company, 7600 Thomas Boulevard, Pittsburgh, Pa.

150. ELECTRIC HEATING UNITS AND EQUIPMENT—Chromalox Catalog 38 contains 64 pages of illustrated descriptions and specifications of standard Chromalox units designed for all industrial applications of electric heat requiring temperatures up to 1000° F.—also valuable information for calculating heat requirements, etc. Edwin L. Wiegand Company, 7600 Thomas Boulevard, Pittsburgh, Pa.

151. ATTIC FAN MANUAL — New four-page bulletin, No. 204-B, entitled "The Coolvent System of Home Ventilation," gives specification data on Coolvent attic fans, suction chambers and automatic louvres. Diagrams in color illustrates attic cooling principle. Text and drawings describe proper installation of the complete System. Autovent Fan & Blower Co., Chicago, Ill.

152. BELT DRIVE PROPELLER FANS—New two-page bulletin No. 206-A describes recently redesigned line of Allvent Fans for industrial, commercial and public building applications. Performanee, dimensions and other specification data are listed in detail. Text explains how application of "31 Series," non-overloading fan wheel is designed to overcome normal restrictions of air flow. Autovent Fan & Blower Co., Chicago, Ill.

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